The Republic of the Union of Myanmar

The 2014 Myanmar Population and Housing Census

THEMATIC REPORT ON FERTILITY AND NUPTIALITY

Census Report Volume 4-A

Department of Population
Ministry of Labour, Immigration and Population

With technical assistance from UNFPA

SEPTEMBER 2016

The 2014 Myanmar Population and Housing Census

THEMATIC REPORT ON FERTILITY AND NUPTIALITY

Census Report
Volume 4-A

For more information contact:

Department of Population
Ministry of Labour, Immigration and Population

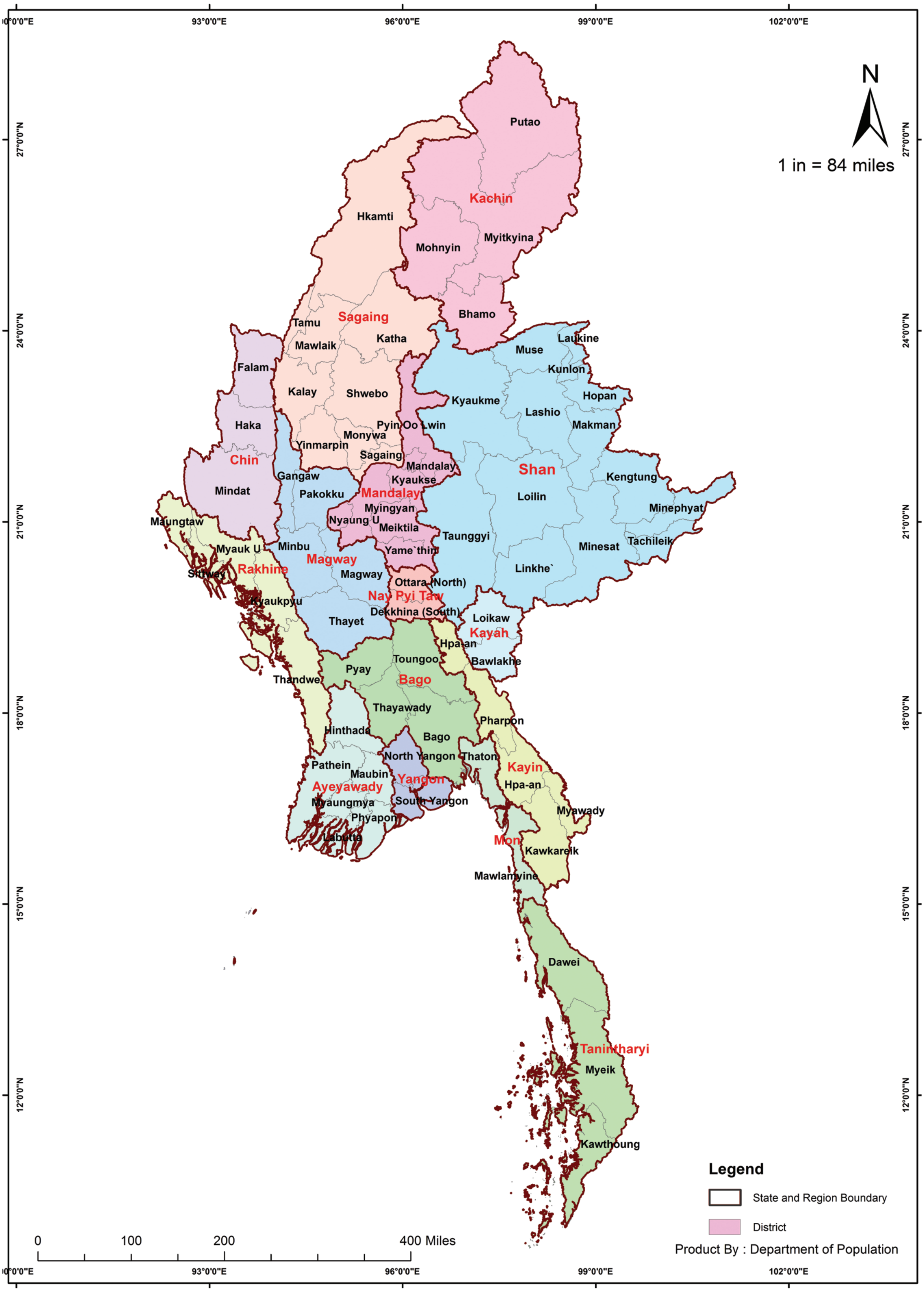
Office No. 48, Nay Pyi Taw, MYANMAR

Tel: +95 67 431 062
www.dop.gov.mm

SEPTEMBER 2016

Figure 1

Map of Myanmar by State/Region and District



Foreword

The 2014 Myanmar Population and Housing Census (2014 Census) was conducted with midnight 29 March 2014 as the reference point. This is the first Census in 30 years; the last was conducted in 1983. Planning and execution of this Census was spearheaded by the former Ministry of Immigration and Population, now the Ministry of Labour, Immigration and Population on behalf of the Government – in accordance with the Population and Housing Census Law, 2013. The main objective of the 2014 Census was to provide the Government and other stakeholders with essential information on the population, in regard to demographic, social and economic characteristics, housing conditions and household amenities. By generating such information at all administrative levels, it is also intended to provide a sound basis for evidence-based decision-making, and to evaluate the impact of social and economic policies and programmes in the country.

The results of the 2014 Census have been published so far in a number of volumes. The first was the *Provisional Results* (Census Volume 1), released in August 2014. The Census Main Results were launched in May 2015. These included *The Union Report* (Census Report Volume 2), *Highlights of the Main Results* (Census Report Volume 2-A), and reports of each of the 15 States and Regions (Census Report Volume 3[A - O]). The reports on *Occupation and Industry* (Census Report Volume 2-B) and *Religion* (Census Report Volume 2-C) were launched in March 2016 and July 2016, respectively.

The current set of the 2014 Census publications comprise thirteen thematic reports and a Census Atlas. They address issues on Fertility and Nuptiality; Mortality; Maternal Mortality; Migration and Urbanization; Population Projections; Population Dynamics; the Elderly; Children and Young People; Education; Labour Force Dynamics; Disability; Gender Dimensions; and Housing Conditions, Amenities and Household Assets. Their preparation involved collaborative efforts with both local and international experts as well as various Government Ministries, Departments and research institutions.

Data capture was undertaken using scanning technology. The processes were highly integrated, with tight controls to guarantee accuracy of results. To achieve internal consistency and minimize errors, rigorous data editing, cleaning and validation were carried out to facilitate further analysis of the results. The information presented in these reports is therefore based on more cleaned data sets, and the reader should be aware that there may be some small differences from the results published in the earlier set of volumes.

This thematic report presents findings on fertility and nuptiality in Myanmar. The analysis shows that the total fertility rate is 2.5 children per woman at the Union level, 1.9 children per woman for urban areas, and 2.8 children per woman for rural areas. Total fertility for States and Regions varies from a high of 5.0 children per woman for Chin State to a low of 1.8 children per woman for Yangon Region. Total fertility appears to have declined at a rate of at least one child per woman per decade between 1970 and 2000. This relatively rapid decline apparently ceased sometime during the 1990s or 2000s. Estimates from the 2001 and 2007 surveys suggest that the level of fertility may have fluctuated between 2000 and 2014, but with no overall trend up or down. The marital status data shows an exceptionally high proportion of women remaining never married at age 50. Analysis of the data for older women suggests that the proportion of unmarried women in Myanmar was high long before 1960. Between 1960 and 1985, however, the percentage of never married women nearly doubled, rising from 6.5 to 12 per cent for women at ages 50-54.

On behalf of the Government of Myanmar, I wish to thank the teams at the Department of Population, UNFPA and the authors for their contribution towards the preparation of these thematic reports. I would also like to thank our development partners, namely; UNFPA, Australia, Finland, Germany, Italy, Norway, Sweden, Switzerland, and the United Kingdom for their support to undertake the Census, as well as the technical support provided by the United States of America.

H.E U Thein Swe
Minister for Labour, Immigration and Population
Republic of the Union of Myanmar

Table of Contents

Foreword / II

List of Tables / VI

List of Figures / VII

List of Tables and Figures in Appendices / VIII

List of Acronyms and Abbreviations / IX

Executive Summary / X

1. Introduction / 1

1.1 Concepts of fertility and nuptiality / 1

1.2 Programme and policy relevance / 1

1.3 The 2014 Population and Housing Census / 2

1.4 Importance of the Census / 3

1.5 Demographic transition / 4

1.6 Overview of the report / 5

2. Recent Fertility / 6

2.1 Introduction / 6

2.2 Source of data / 6

2.3 Method of estimation / 7

2.4 Fertility and marital fertility for the States/Regions / 8

2.5 Adolescent fertility / 12

2.6 Estimates for Districts and Townships / 13

2.7 Data quality and accuracy of estimates / 14

3. Trends in Fertility / 17

3.1 Introduction / 17

3.2 Total fertility estimates, 1970-2014 / 17

3.3 Fertility trend from the population age distribution / 21

3.4 Fertility trend from children ever born data, 1940-1990 / 21

4. Marital Status / 25

4.1 Introduction / 25

4.2 Age patterns of marital status at the 2014 Census / 25

4.3 Changing proportions married and mean age at marriage, 1973-2014 / 28

4.4 Never married women in Myanmar, 1914-2014 / 30

4.5 Widows with children / 34

5. Marital Sorting / 36

5.1 Introduction / 36

5.2 Head couples / 36

5.3 Age difference between spouses / 37

5.4 Literacy / 39

5.5 Educational attainment / 39

5.6 Township of birth / 40

5.7 Economic activity status / 42

6. Fertility Differentials / 44

6.1 Introduction / 44

6.2 Fertility differentials / 44

6.3 Marital fertility differentials / 47

6.4 Fertility of head couple wives by characteristics of husband / 49

6.5 Fertility of head couple wives by characteristics of wife / 51

6.6 Fertility of non-head couple wives / 53

Table of Contents

7. Conclusion / 56

7.1 Methodological Issues / 56

7.2 Areas for further research / 56

7.3 Computer applications for small area estimation / 57

7.4 The next population census / 57

7.5 Development of civil registration and vital statistics (CRVS) / 59

References / 60

Glossary of terms and definitions / 67

Appendices / 70

Appendix A. Method of Estimation / 71

A1 Input data / 71

A2 Preliminary calculations / 72

A3 Fertility change models: An alternative to P/F methods / 75

A4 Estimation of total fertility and age-specific fertility rates / 76

A5 Implementation / 78

A6 Variability of births over Townships / 78

A7 Variability of total fertility and adjustment factors over Townships / 78

A8 Estimates from the 2001 FRHS / 78

A9 Estimates from the 2007 FRHS / 78

Appendix B. Fertility estimates for Myanmar, States/Regions, Districts, and Townships, Myanmar 2014 Census / 84

List of Contributors / 100

List of Tables

2.1 Total fertility rates, adjusted and unadjusted, and adjustment factors, Union, urban and rural areas, and States/Regions (2014 Census), with selected international comparisons
2.2 Recent age-specific fertility and marital fertility rates, Union, urban and rural areas, and States/Regions, 2014 Census
2.3 Adolescent fertility rates for Union, urban and rural areas, and States/Regions, 2014 Census
3.1 Total fertility estimates from multiple sources, 1976-2014
3.2 Time plot of mean number of children ever born to women aged 50 and over at the time of the 1983 Census, the 1991 Population Changes and Fertility Survey, and the 2014 Census, with year cohort reached age 30 years
4.1 Age-specific proportions of persons aged 15 years and over by sex and marital status, 2014 Census
4.2 Percentage of population aged 10 and over never married, and singulate mean age at marriage by sex, by age, various sources
4.3 Percentages of females who were never married at ages 50-89, selected Asian countries, 2010 round of censuses
4.4 Percentages never married for post-reproductive age women, 1973, 1983 and 2014 censuses; 1991 Population Changes and Fertility Survey
4.5 Percentage of widows by number of surviving children by age of widow, 2014 Census
5.1 Mean and partial distribution of age of husband minus age of wife for head couples, 2014 Census
5.2 Head couples by literacy of husband and literacy wife, 2014 Census
5.3 Head couples by completed level of educational attainment of husband and completed level of educational attainment of wife (numbers in thousands), 2014 Census
5.4 Head couples by whether husband and wife were born in same Township, 2014 Census
5.5 Head couples by economic activity of husband and economic activity of wife (numbers in thousands), 2014 Census
6.1 Age-specific and total fertility rates by selected characteristics of women, 2014 Census
6.2 Age-specific and total marital fertility rates by selected characteristics of women, 2014 Census
6.3 Age-specific and total marital fertility rates of head couple wives by selected characteristics of husband, 2014 Census
6.4 Age-specific and total marital fertility rates of head couple wives by selected characteristics of wife, 2014 Census
6.5 Age-specific and total marital fertility rates of non-head couple wives by selected characteristics of wife, 2014 Census

List of Figures

1 Map of Myanmar by State/Region and District
2.1 Fertility questions in the main 2014 Census questionnaire
2.2 Adjusted and unadjusted total fertility rates for Union and States/Regions, 2014 Census
2.3 Recent age-specific marital fertility rates for Union and States/Regions, 2014 Census
2.4 Recent total marital fertility rates for Union and States/Regions, 2014 Census
2.5 Total fertility rates for States/Regions and Districts, 2014 Census
3.1 Total fertility estimates from multiple sources, 1976-2014
3.2 Time plot of mean number of children ever born to women aged 50-54 and over, 1983 Census, 1991 Population Changes and Fertility Survey, and the 2014 Census, Myanmar
4.1 Age-sex patterns of persons aged 15 years and over by marital status, 2014 Census
4.2 Proportions of women never married at age 50-54: selected Asian countries, 2010 round of censuses
4.3 Time plots of proportions never married for women aged 50 and over, 1973, 1983 and 2014 censuses and 1991 Population Changes and Fertility Survey
5.1 Mean age difference at marriage between head couple spouses, 2014 Census
5.2 Percentage of head couples where husband and wife were born in different Townships, 2014 Census
6.1 Total fertility rates by selected characteristics of women, 2014 Census
6.2 Total marital fertility and total fertility rates by selected characteristics of women, 2014 Census
6.3 Total marital fertility rate of head couple wives by selected characteristics of husband, 2014 Census
6.4 Total marital fertility rates of head couple wives by selected characteristics of wife and husband, 2014 Census
6.5 Total marital fertility rates of non-head couple and head couple wives by selected characteristics of wife, 2014 Census

List of Tables and Figures in Appendices

Appendix A. **Method of Estimation**

Table A1
Input data and preliminary calculations for estimation of recent fertility, 2014 Census
Table A2
Estimation of age-specific and total fertility rates, 2014 Census
Figure A1
Mean number of children ever born by age of mother, 2014 Census
Figure A2
Distribution of births among the 413 Townships, 2014 Census
Figure A3
Adjustment factor by estimated total fertility, 413 Townships, 2014 Census
Table A3
Input data and preliminary calculations for estimation of recent fertility, 2001 Fertility and Reproductive Health Survey
Table A4
Estimates of age-specific and total fertility rates, 2001 Fertility and Reproductive Health Survey
Figure A4
Mean number of children ever born by age of mother, 2001 Fertility and Reproductive Health Survey
Table A5
Input data and preliminary calculations for estimation of recent fertility, 2007 Fertility and Reproductive Health Survey
Table A6
Estimates of age-specific and total fertility rates, 2007 Fertility and Reproductive Health Survey
Figure A5
Mean number of children ever born by age of mother, 2007 Fertility and Reproductive Health Survey

Appendix B. **Fertility estimates for Myanmar, States/Regions, Districts, and Townships, Myanmar 2014 Census**

Table B1
Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

List of Acronyms and Abbreviations

ASEAN	Association of Southeast Asian Nations
ASFR	Age-Specific Fertility Rate
ASMFR	Age-Specific Marital Fertility rate
CBR	Crude Birth Rate
CDR	Crude Death Rate
CEB	Children Ever Born
CRVS	Civil Registration and Vital Statistics
FRHS	Fertility and Reproductive Health Survey
IUSSP	International Union for the Scientific Study of Population
MCEB	Mean number of children ever born
PCFS	Population Changes and Fertility Survey
PCMW	Proportion of currently married women
PNM	Proportion never married
SMAM	Singulate Mean Age at Marriage
TFR	Total Fertility Rate
TMFR	Total Marital Fertility Rate
UN	United Nations
UNPD	United Nations Population Division
UNSD	United Nations Statistics Division

Executive Summary

This report presents estimates of fertility and nuptiality based on the 2014 Population and Housing Census of the Union of Myanmar. The estimates are analysed to facilitate critical assessment, interpretation, and use. The analysis also uses information from the 1983 and 1973 population censuses, the 1991 Population Changes and Fertility Survey, and the 1997, 2001, and 2007 Fertility and Reproductive Health Surveys.

Chapter 2 (Recent Fertility), presents estimates of total fertility and total marital fertility during the 12 months prior to the Census for the Union of Myanmar, for urban and rural areas, and for the 15 States and Regions of the Union.

Total fertility is estimated to be 2.5 children per woman at the Union level, 1.9 children per woman for urban areas, and 2.8 children per woman for rural areas. Total fertility for States and Regions varies from a high of 5.0 children per woman for Chin State to a low of 1.8 children per woman for Yangon Region (Table 2.2). Total fertility estimates for Districts and Townships are presented in Appendix B, Table B1.

The estimates are produced using a newly developed method, described in Appendix A, Method of Estimation, which takes account of the pattern of fertility change in Myanmar (Section 2.3).

Chapter 3 (Trends in Fertility) assesses the trend of fertility in Myanmar since 1940. Estimates from the 1983 census and the 1991, 1997, 2001 and 2007 surveys are used. Comparison of estimates from the earlier census and surveys show discrepancies of as much as 0.5 children per woman.

Total fertility appears to have declined at a rate of at least one child per woman per decade between 1970 and 2000. This relatively rapid decline apparently ceased sometime during the 1990s or 2000s. Estimates from the 2001 and 2007 surveys suggest that the level of fertility may have fluctuated between 2000 and 2014, but with no overall trend up or down (Figure 3.1).

Analysis of data on children ever born for women aged over 50 at the time of the 2014 Census indicates that total fertility in Myanmar was rising between 1940 and 1965 (Figure 3.2).

Chapter 4 (Marital Status) presents information on age patterns of never married, married, and widowed women, and age at first marriage from the 2014 Census. It also presents and analyses information on age at first marriage from the 1973 and 1983 censuses and the 1991, 1997, 2001 and 2007 surveys.

The analysis suggests that the proportions of never married women in the surveys are too high, resulting in spurious discontinuities in the apparent trend of mean age at first marriage. It is unclear why this should be, but the conclusion is clearly indicated. Taking account of this assumed bias in the survey, the results suggests that age at first marriage among women rose reasonably steadily from 24.5 years just prior to the 1991 PCFS survey to 26.2 years just prior to the 2007 FRHS survey (section 4.3).

The 2014 Census marital status data shows an exceptionally high proportion of women remaining never married at age 50 (Figure 4.2). Analysis of the data for older women suggests that the proportion of never married women in Myanmar was relatively high before 1960 compared to other countries within the ASEAN region. Between 1960 and 1985, however, the percentage of never married women nearly doubled, rising from 6.5 to 12 per cent for women at ages 50-54 (Figure 4.3).

The unusually large difference between female and male mortality in Myanmar results in unusually large proportions of widowed women aged 35 and over (Figure 4.1). These women have substantial numbers of surviving children (Table 4.6).

Chapter 5 (Marital Sorting) uses the 2014 Census information on relationship to head of household to quantify the tendency of people to choose spouses with characteristics similar to their own. This is shown to be true for literacy and educational attainment, but less so for economic activity status and occupation.

Chapter 6 (Fertility Differentials) compares total fertility rate and total marital fertility rate for women with different socioeconomic characteristics. Differences by literacy and education are strong and consistent. The methods developed for marital sorting are used to compare total marital fertility for women classified by their own and their husband's occupation (Figures 6.3 and 6.4).

Chapter 7 (Conclusion) discusses several issues encountered during the production of this report, with recommendations for the next population census based on this experience, and highlights the fundamental importance of implementing well-developed civil registration and vital statistics (CRVS) systems in developing countries.

Chapter 1. Introduction

1.1 Concepts of fertility and nuptiality

This report presents estimates of fertility and nuptiality during the 12 months prior to the 2014 Population and Housing Census for the Union of Myanmar, for the country's States and Regions, and Districts and Townships, and includes a critical assessment and interpretation of these estimates. The 2014 Census estimates are compared with estimates from previous censuses and surveys in Myanmar to assess the trend of fertility over the past four decades.

"Fertility" refers in demography to the reproductive behaviour of women and couples to the statistics describing the results of this behaviour. The number of births in a population during a particular year is one example of a fertility statistic. "Completed fertility", defined as the average number of children born to a cohort of women at the end of their reproductive lives, is another example.

The fertility of a population is one of three factors that determine long-term population growth. The other two factors are mortality and migration. Population growth is also influenced by the population age distribution. This influence comes about because the incidence of births, deaths, and migrations varies greatly with age.

"Nuptiality" refers to the behaviour of men and women with respect to marriage and divorce, and to statistics describing the results of this behaviour. Numbers of marriages and divorces in a population during a year are examples of nuptiality statistics. The proportion of a cohort of women past the end of their reproductive age span who never married, and the proportion of marriages dissolved by divorce are other examples.

Nuptiality and fertility are often studied together because nuptiality affects fertility. If childbearing tends to be confined to married couples, as it is in many societies, higher proportions of women marrying will tend to higher fertility, and lower proportions will tend to lower fertility. Population change may therefore be indirectly influenced by nuptiality.

The family is a fundamental social institution in every society, and nuptiality describes the formation of families by marriage and their disruption by divorce. Nuptiality is therefore relevant to the study of society generally, quite aside from its influence on population growth.

1.2 Programme and policy relevance

Population numbers are fundamental to national programme and policy issues in education, health, labour, social welfare, economic development, and in many other areas. Economic and social development are fundamentally about people. A population census provides information on people throughout the national territory.

Because a population census is a complete enumeration of the national population, it can provide information on numbers and characteristics of the population for even the smallest subnational areas and population subgroups. This information is invaluable for planning the delivery of services that need to be targeted and delivered at the local level, including education and health services.

Fertility statistics are of particular interest for the provision of reproductive and child health services, including antenatal care, postnatal care, and child immunization. Appendix B, Table B1, provides estimated numbers of births for 502 subnational areas of the country, including the 15 States and Regions, the 74 Districts, and the 413 Townships in existence at the time of the Census. These numbers provide an indication of demand for reproductive and child health services.

For planning beyond the very short term, recent population statistics are inadequate. Estimates of future population numbers are needed. Population projection is a method for estimating future population numbers based on the Census age-sex distribution and estimates of past levels and trends in fertility, mortality, and international migration. Estimates of the level and trend of fertility therefore provide essential inputs for population projections.

1.3 The 2014 Population and Housing Census

The 2014 Myanmar Population and Housing Census adopted a *de facto* methodology where, with some exceptions, individuals were enumerated at the place they were present on the 29 March 2014 (Census night). The field operation was completed in almost all areas of the country within 12 days of the start of enumeration, with the total enumerated population being 50,279,900.

Some populations in three areas of the country were not enumerated. This included an estimate of 1,090,000 persons residing in Rakhine State, 69,800 persons living in Kayin State, and 46,600 persons living in Kachin State (see Department of Population, 2015 for the reasons that these populations were not enumerated). In total, therefore, it is estimated that 1,206,400 persons were not enumerated in the Census. The estimated total population of Myanmar on Census night was 51,486,253. The analysis in this report covers only the enumerated population. It is worth noting that in Rakhine State an estimated 34 per cent of the population were not enumerated and, hence, indicators for this State only represent about two-thirds of the estimated population.

Extensive efforts were undertaken to ensure that the results of the Census conformed to international standards and guidelines. These efforts included the formation of an International Technical Advisory Board (ITAB) comprising 15 experts from different countries. The ITAB has been involved in providing advice and recommendations at all stages of the Census. In addition, community support groups were involved, and a well-developed management structure oversaw the planning and implementation of the Census. The United Nations provided technical support through UNFPA at all stages of the Census.

The methodology of the 2014 Census is described in detail in Department of Population (2015), and that publication can be referred to for a detailed description of the process of planning and implementation of the Census.

Two census questionnaires were used, one for persons in conventional households, and one for persons in institutions. The questionnaire for the institutional population included 11 questions, including questions on age, sex, and marital status, but did not include questions on fertility. The Census counted 2,349,901 persons in institutions and 47,929,999 persons in the 10,877,832 enumerated conventional households (Department of Population, 2015).

The main census questionnaire included questions on numbers of children ever born, and month and year of most recent live birth for ever-married women aged 15 years and over. Missing values were imputed during the editing phase of Census data processing. The questions are shown in Figure 2.1 in Chapter 2. The 2014 Census enumerated 18,380,789 women aged 15 years and over in conventional households, of whom 10,950,951 were married.

The Nay Pyi Taw Union Territory was created in 2006. It appears in the 2014 Census reports as one of Myanmar's 15 States and Regions. It was formerly part of Mandalay Region (see Department of Population (2015) page 15).

The last two population and housing censuses of Myanmar (then Burma) were undertaken in 1983 and 1973. For information on earlier censuses see Maung, 1986, and the reports published by the Department of Population. Four major population surveys were conducted by the Department of Population between the 1983 and 2014 censuses; the 1991 Population Changes and Fertility Survey and the 1997, 2001 and 2007 Fertility and Reproductive Health Surveys. Civil registration in Myanmar is insufficiently developed to provide data for estimates of fertility.

1.4 Importance of the Census

Fertility and nuptiality statistics are (generally) calculated from two different data sources: population censuses provide numbers of persons in population subgroups defined by sex, age, place of residence, and other characteristics; and civil registration systems provide numbers of births, marriages and divorces distributed by the same characteristics. The most important fertility and nuptiality statistics relate number of births, marriages or divorces to persons in a cohort to the number of persons in that age group.

Where civil registration systems do not exist or are incompletely developed, population censuses may be used to generate estimates of basic statistics of fertility and nuptiality. However, population censuses are typically taken every ten years, whereas civil registration systems operate continuously and typically publish statistics of births, deaths, marriages, divorces, and other vital events annually.

The development of civil registration systems where they do not exist, or are incompletely developed, is therefore of great practical importance. Population censuses and surveys provide expedient methods in the interim, but there is no substitute for a fully developed civil registration system. In the absence of a sufficiently well-developed civil registration system in Myanmar (as noted above), the 2014 Census therefore provides an important opportunity to update information on fertility and nuptiality.

1.5 Demographic transition

The relation between fertility and population change is best understood in relation to the demographic transition. Before the beginning of the 19th century, most human societies were characterized by high mortality, high fertility, low population growth, and a young population age distribution. High mortality kept population growth low and made the population age distribution young, meaning that the number of persons declined sharply as age increased, so that there were very few older persons in relation to the number of young persons.

Demographic transition begins with a decline in mortality. Fertility remains high for some time, and may even increase. Declining mortality and high fertility results in rising population growth. After some time, fertility begins to decline, which pushes the population growth rate down. In the long run, the population age distribution becomes older as a result of low (sometimes zero or negative) population growth and high survivorship, resulting from low mortality risks.

Mortality decline tends to be driven by economic development and improvements in public health. Fertility decline is ultimately driven by mortality decline, though many factors - including rising levels of education, economic development, and the availability and acceptance of family planning - influence when the fertility decline begins and how rapidly it proceeds (Dyson 2010).

Changing population age distribution is as much a part of demographic transition as changing levels of fertility and mortality. The role of age distribution, although fundamental, is less widely appreciated than the role of fertility and mortality change.

Demographic transitions vary widely from one population to another, but it is useful to give some general idea of the magnitudes of the changes in fertility, mortality and population growth. The most useful statistics for this purpose are the expectation of life at birth and level of completed fertility. Expectation of life at birth is simply the average length of life. Completed fertility (as noted above) refers to the average number of children women bear over their lifetime.

Before the demographic transition, expectation of life at birth may be 30 years, and completed fertility at five or six children per woman. Towards the end of a demographic transition, expectation of life at birth may rise to 70-80 years while completed fertility falls to around two children per woman. Population growth rates may rise from near zero at the beginning of the transition to over three per cent per annum before declining towards, and even perhaps below, zero.

As for age distribution, there may be one person aged 60-64 for every ten persons aged 0-4 before the transition begins, the result of low growth and low survivorship to older ages. Post-transition, there may be as many 60-64 year olds as there are 0-4 year old children. If completed fertility falls and remains below two children per woman for an extended period, persons aged 60-64 may greatly outnumber children aged 0-4.

Estimates of fertility, mortality, and migration and population age distribution produced by the United Nations provide an invaluable source for learning about demographic transitions in developing countries (United Nations Population Division, 2012). For a recent introduction to, and overview of the demographic transition, see Dyson (2010). Other recommended reading includes Kingsley (1963) and Chadwell et al (1988). For recent work focused on Asia see Feeney (1994) and Feeney and Mason (2001).

1.6 Overview of the report

Chapter 2 describes the fertility questions asked in the 2014 Census, and presents and analyses estimates for the 12 months prior to the Census (that is, April 2013 to March 2014).

Chapter 3 considers the trend in fertility in Myanmar over the last four decades and, more briefly, back to 1940. It makes use of information from the 1973 and 1983 censuses, the 1991 Population Changes and Fertility Survey, and the 1997, 2001 and 2007 Fertility and Reproductive Health Surveys.

Chapter 4 presents nuptiality information based on the 2014 Census question on marital status, the only question on nuptiality included in the Census.

Chapter 5 extends the analysis of nuptiality by examining marital sorting, defined as the tendency for people to marry spouses with characteristics similar to their own. The Census question on relation to head of households is used to identify married couples in households. These married couples are then cross-classified by characteristics of the husband and characteristics of the wife.

Chapter 6 examines differences in fertility between population subgroups defined by literacy, education, economic activity status, and occupation. The analysis of Chapter 5 is used to estimate fertility of women by characteristics of their husbands.

Chapter 2. Recent Fertility

2.1 Introduction

Recent fertility refers to fertility during the 12 months prior to the Census reference date. This chapter presents estimates of recent fertility based on the 2014 Census. Estimates are given for the Union, urban and rural areas, and States and Regions. Estimates for Districts and Townships are presented in Appendix B, Table B1.

2.2 Source of data

Figure 2.1 shows the fertility questions included in the main census questionnaire. Fertility information was obtained for women in conventional households only. As already reported (Department of Population, 2015, page 29), some 95.3 per cent of the population was enumerated in conventional households.

Figure 2.1

Fertility questions in the main 2014 Census questionnaire

EVER MARRIED WOMEN (AGED 15 AND ABOVE)													
Number of children ever born alive								Particulars of last live birth					
25. Number of children ever born alive *(If no children, write "00")*		26. How many of those children are living in this household?		27. How many of those children are living elsewhere (not in this household)?		28. How many of those children are no longer alive (dead)?		29. Date of last live birth		30. Sex of last live birth		31. Is the child still alive?	
Male	Female	Male	Female	Male	Female	Male	Female	Month	Year	Male	Female	Yes	No
										1	2	1	2
										1	2	1	2
										1	2	1	2
										1	2	1	2
										1	2	1	2
										1	2	1	2
										1	2	1	2
										1	2	1	2

Source: Department of Population (2015) Annex 1, pages 254-257.

Furthermore, the fertility questions were only asked of ever-married women aged 15 years and over; the fertility of never married women in Myanmar is believed to be statistically insignificant. No nationally representative statistical evidence exists because questions on non-marital fertility have not been included in past population censuses or nationally representative surveys. It may be noted that not asking never married women questions on childbearing is a standard census practice when cultural values suggest that such questions may provoke severely negative respondent reaction.

The responses to the questions on month and year of last live birth were used to determine the number of live births during the twelve months prior to the Census, April 2013 to March 2014. Such questions may provide a more complete count of births than a direct question on births during the 12 months prior to the Census. As noted by Brass and Coale (1971, page 16): "Results are better, because, when one asks 'When did you have your last child?' some kind of definite and certain answer is almost mandatory. On the other hand, the question 'Did you have a child last year?' almost invites a 'no' response."

2.3 Method of estimation

Recent fertility estimates were generated using a new method specifically developed for application to the 2014 Myanmar Census data. The method makes two assumptions made by P/F ratio methods (Moultre et al, 2013; IUSSP, 2011a): firstly, that under- or over-reporting of births during the year prior to the Census tends to be similar for all ages of women, so that the age pattern of births is approximately correct; and secondly, that the number of children ever born is reasonably completely reported at least for younger women. Unlike P/F ratio methods, however, it does not assume constant fertility during the 35 years prior to the Census.

The original Brass P/F ratio method and the Trussell variant of the method presented in Chapter II of *Manual X: Indirect Techniques of Demographic Estimation* by the United Nations Population Division (1983) assume that fertility has been constant for 35 years (the length of the reproductive age span) prior to the Census. The results in Chapter 3 show that these methods are not valid for Myanmar.

The relational Gompertz variant of the P/F ratio method developed by Zaba (1981) and presented in Chapter 6 of *Tools for Demographic Estimation* (Moultrie et el, 2013) (see also IUSSP, 2011b) does not assume constant fertility and might be applied to the 2014 Census data, but this method has several disadvantages. It assumes that the Gompertz relational model with the Booth standard fits both the age-pattern of births during the year prior to the Census and the age pattern of mean children ever born values, and it does not model changes in the level and age pattern of fertility over time (International Union for Scientific Study of Population, 2011).

The method used to produce the estimates in this report takes input data by single years of age, making it unnecessary to use a model for the age patterns of fertility, and it explicitly models changing levels and age patterns of fertility over time, eliminating the constant fertility assumption. The method is described in detail in Appendix A, which includes a step-by-step example of its application to fertility data for the Union of Myanmar.

2.4 Fertility and marital fertility for the States/Regions

Table 2.1 compares adjusted and unadjusted estimates of the total fertility rates for the Union of Myanmar, for urban and rural areas, and for States and Regions. The adjustments are not large, for the most part, but they do indicate a modest deficit of births during the year prior to the Census calculated from responses for month and year of most recent live birth. The factor for the Union is 1.10, indicating a deficit of about 10 per cent. The deficit is slightly larger in rural areas than in urban areas. The largest factors are in Rakhine (1.24), Chin and Shan States (both 1.15). However, the figure for Rakhine should be treated with some care in view of the extent of non-enumeration in that State. Figure 2.2 plots the rates for the States and Regions.

The estimated total fertility at the Union level is 2.5 children per woman. Levels in urban and rural areas are, respectively, 1.9 and 2.8 children per woman. Figure 2.2 plots total fertility rates of the Union as well as in 15 States and Regions. Chin, with a total fertility of 5.0 children per woman, is an outlier. Total fertility levels in the remaining States and Regions range fairly evenly from a low of 1.8 children per woman in Yangon to a high of 3.5 children per woman in Kayah.

Table 2.1

Total fertility rates, adjusted and unadjusted, and adjustment factors, Union, urban and rural areas, and States/Regions (2014 Census) with selected international comparisons

	Total fertility rate		
Area	**Unadjusted**	**Adjusted**	**Factor**
Union	2.29	2.51	1.10
Urban	1.79	1.91	1.07
Rural	2.52	2.78	1.11
World	-	2.65	-
Developing	-	2.51	-
Developed	-	1.67	-
SE Asia	-	2.35	-
Cambodia	-	2.70	-
Indonesia	-	2.50	-
Malaysia	-	1.97	-
Philippines	-	3.04	-
Singapore	-	1.23	-
Thailand	-	1.53	-

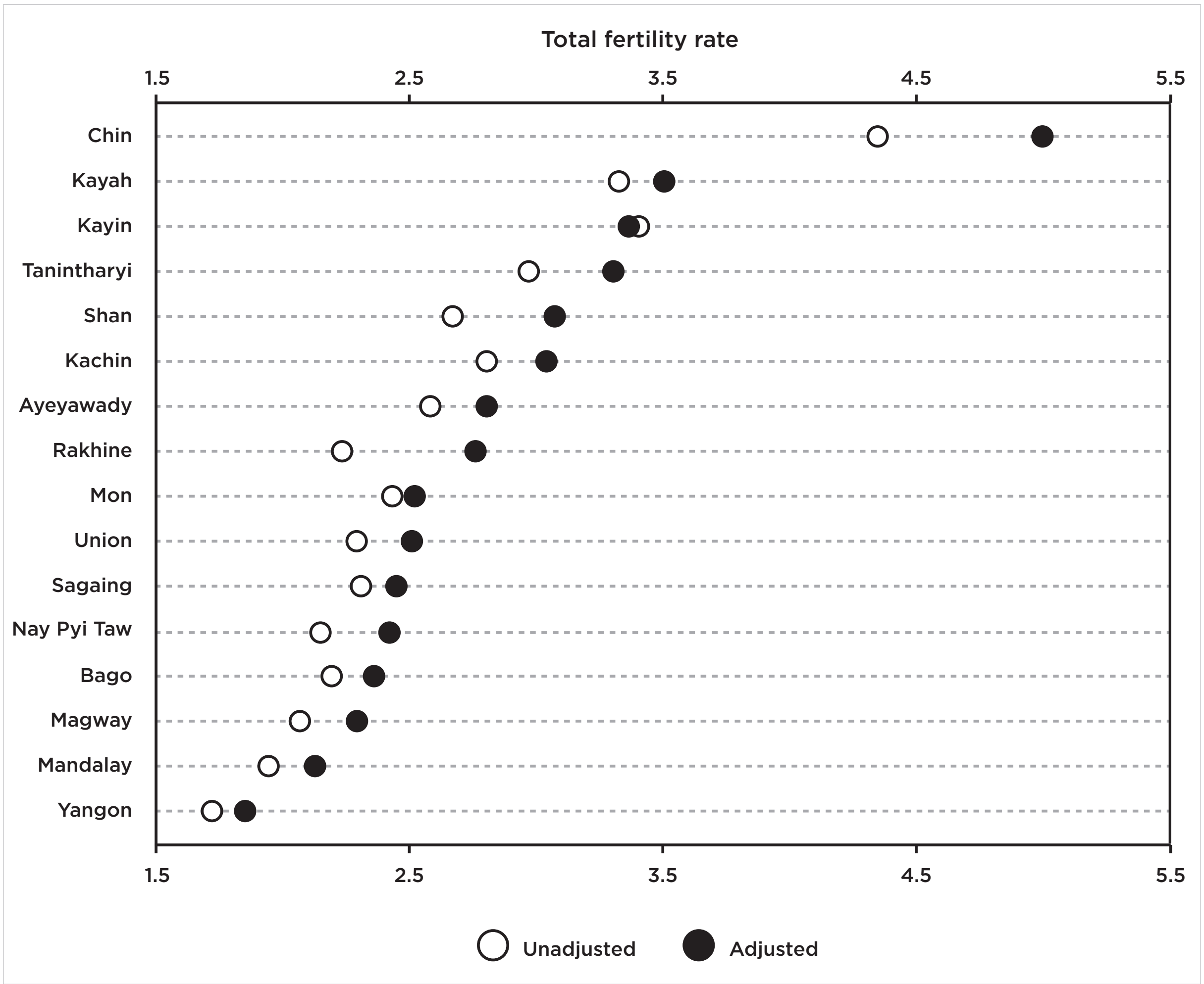
	Total fertility rate		
State/Region	**Unadjusted**	**Adjusted**	**Factor**
Kachin	2.81	3.04	1.08
Kayah	3.33	3.51	1.05
Kayin	3.41	3.37	0.99
Chin	4.35	5.00	1.15
Sagaing	2.31	2.45	1.06
Tanintharyi	2.97	3.31	1.11
Bago	2.19	2.36	1.08
Magway	2.07	2.29	1.10
Mandalay	1.94	2.12	1.09
Mon	2.43	2.52	1.04
Rakhine	2.23	2.76	1.24
Yangon	1.72	1.85	1.08
Shan	2.67	3.07	1.15
Ayeyawady	2.58	2.81	1.09
Nay Pyi Taw	2.15	2.42	1.13

Source: Appendix B, Table B1 for Myanmar estimates, United Nations Population Division (2012) for international estimates.

Note: Adjustment factors rounded to two decimal places. Developing=Developing countries; Developed=Developed Countries.

Figure 2.2

Adjusted and unadjusted total fertility rates for Union and States/Regions, 2014 Census



Source: Table 2.1

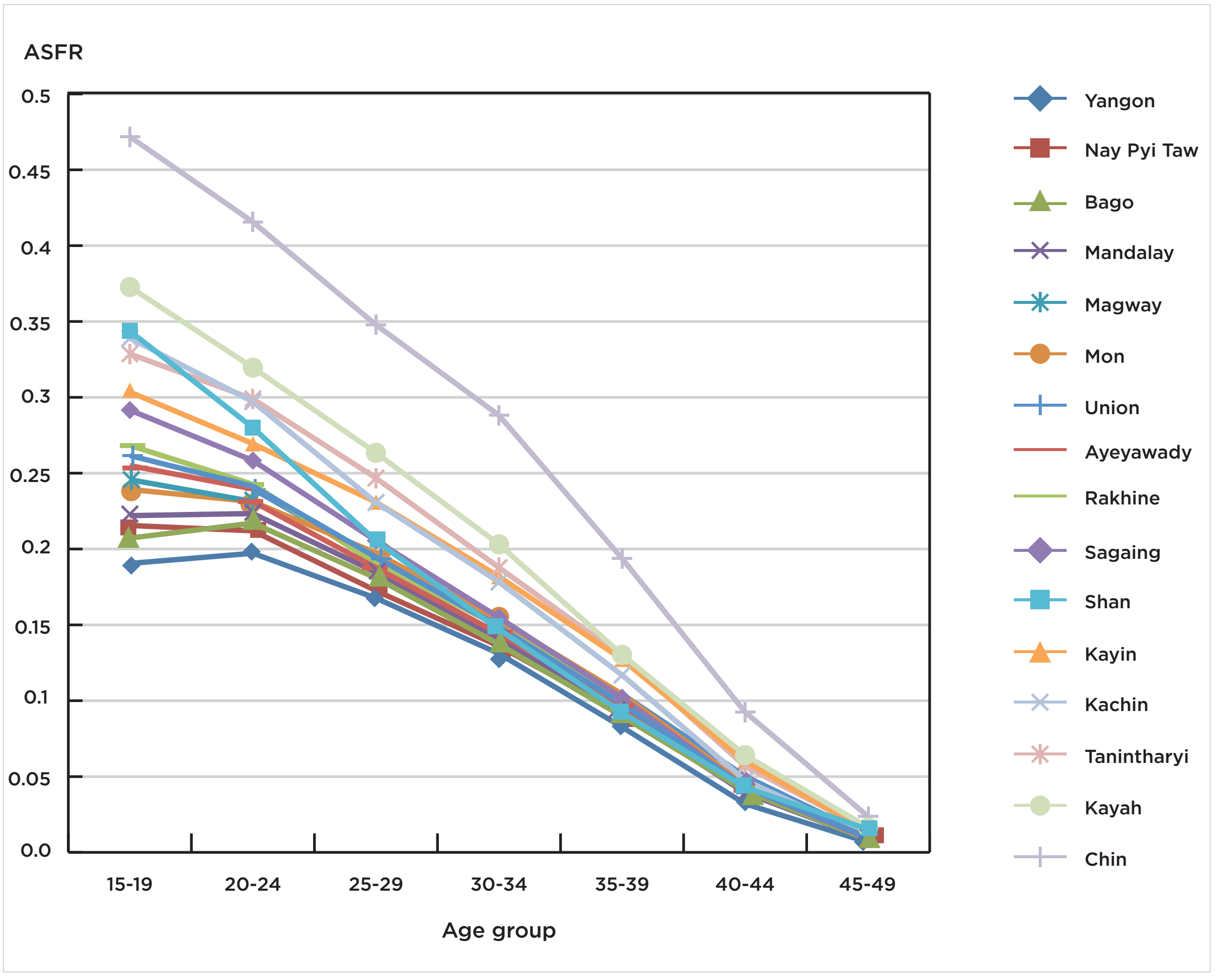
Table 2.1 shows the fertility of Myanmar within an international context by including United Nations Population Division estimates for selected countries and world regions for 2010-2015. The level of total fertility in Myanmar is similar to the level in developing countries generally, but is somewhat higher than the level in Southeastern Asia. The level in Myanmar is lower, for example, than in the Philippines and Cambodia, but higher than in Malaysia, Thailand and Singapore.

Table 2.2 shows age patterns of recent fertility and marital fertility with summary measures of level for each State and Region. Marital fertility may be measured by age-specific or duration-specific marital fertility rates for married women. The marital fertility data are illustrated in Figure 2.3. For age groups 20-24 through to 45-49 years the rates decline reasonably smoothly and nearly linearly, but the levels for the 15-19 age group are erratic, sometimes lower than the rate of the 20-24 age group, sometimes higher.

Total marital fertility is defined as five times the sum of the age-specific marital fertility rates. It is interpreted as the completed fertility for a birth cohort of women all of whom marry at age 15 years and experience the given age-specific marital fertility rates. Figure 2.4 shows the total marital fertility rate for the Union and for each State and Region.

Figure 2.3

Recent age-specific marital fertility rates for Union and States/Regions, 2014 Census



Source: Table 2.2

Table 2.2

Recent age-specific fertility and marital fertility rates, Union, urban and rural areas, and States/Regions, 2014 Census

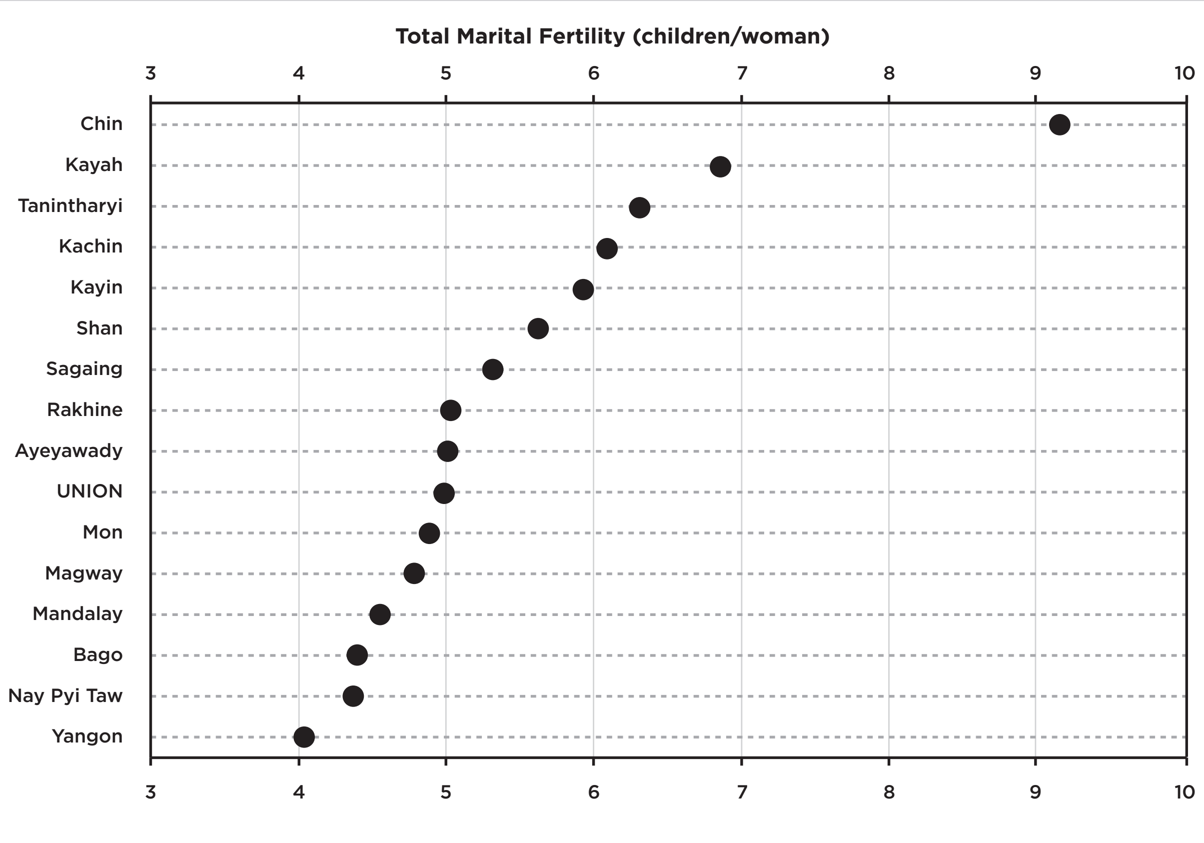
Age-specific fertility rate								
Place	15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Union	0.0332	0.1087	0.1292	0.1124	0.0765	0.0334	0.0075	2.51
Urban	0.0223	0.0773	0.1032	0.0942	0.0589	0.0215	0.0047	1.91
Rural	0.0380	0.1236	0.1409	0.1205	0.0845	0.0390	0.0088	2.78
Kachin	0.0373	0.1346	0.1636	0.1386	0.0902	0.0363	0.0079	3.04
Kayah	0.0378	0.1443	0.1857	0.1631	0.1067	0.0511	0.0126	3.51
Kayin	0.0393	0.1373	0.1739	0.1530	0.1094	0.0507	0.0109	3.37
Chin	0.0496	0.2048	0.2544	0.2350	0.1623	0.0759	0.0183	5.00
Sagaing	0.0307	0.1057	0.1284	0.1109	0.0761	0.0322	0.0066	2.45
Tanintharyi	0.0381	0.1380	0.1705	0.1506	0.1071	0.0471	0.0114	3.31
Bago	0.0280	0.1046	0.1245	0.1058	0.0713	0.0318	0.0062	2.36
Magway	0.0266	0.0977	0.1193	0.1039	0.0718	0.0318	0.0065	2.29
Mandalay	0.0234	0.0882	0.1122	0.0988	0.0663	0.0285	0.0061	2.12
Mon	0.0274	0.1019	0.1323	0.1178	0.0827	0.0347	0.0071	2.52
Rakhine	0.0385	0.1296	0.1404	0.1189	0.0818	0.0347	0.0088	2.76
Yangon	0.0208	0.0707	0.0965	0.0918	0.0615	0.0237	0.0047	1.85
Shan	0.0588	0.1535	0.1539	0.1213	0.0781	0.0356	0.0122	3.07
Ayeyawady	0.0397	0.1263	0.1397	0.1215	0.0855	0.0407	0.0085	2.81
Nay Pyi Taw	0.0334	0.1082	0.1233	0.1075	0.0736	0.0320	0.0067	2.42

Age-specific marital fertility rate								
Place	15-19	20-24	25-29	30-34	35-39	40-44	45-49	TMF
Union	0.2616	0.2414	0.1946	0.1487	0.0980	0.0430	0.0100	4.99
Urban	0.2256	0.2164	0.1781	0.1351	0.0809	0.0298	0.0068	4.36
Rural	0.2738	0.2502	0.2008	0.1541	0.1051	0.0487	0.0113	5.22
Kachin	0.3390	0.2971	0.2307	0.1782	0.1169	0.0475	0.0102	6.10
Kayah	0.3727	0.3196	0.2634	0.2031	0.1303	0.0641	0.0164	6.85
Kayin	0.3035	0.2694	0.2309	0.1818	0.1273	0.0600	0.0135	5.93
Chin	0.4718	0.4156	0.3478	0.2881	0.1938	0.0925	0.0236	9.17
Sagaing	0.2916	0.2583	0.2055	0.1548	0.1019	0.0429	0.0090	5.32
Tanintharyi	0.3286	0.2989	0.2468	0.1877	0.1293	0.0568	0.0144	6.31
Bago	0.2072	0.2171	0.1809	0.1372	0.0897	0.0406	0.0082	4.40
Magway	0.2457	0.2313	0.1876	0.1441	0.0966	0.0426	0.0089	4.78
Mandalay	0.2220	0.2234	0.1847	0.1410	0.0917	0.0393	0.0086	4.55
Mon	0.2393	0.2312	0.1974	0.1534	0.1043	0.0444	0.0093	4.90
Rakhine	0.2683	0.2426	0.1903	0.1491	0.1013	0.0434	0.0113	5.03
Yangon	0.1905	0.1972	0.1676	0.1310	0.0826	0.0320	0.0066	4.04
Shan	0.3437	0.2800	0.2053	0.1469	0.0922	0.0428	0.0152	5.63
Ayeyawady	0.2550	0.2396	0.1932	0.1516	0.1043	0.0502	0.0109	5.02
Nay Pyi Taw	0.2155	0.2120	0.1725	0.1360	0.0914	0.0400	0.0087	4.38

Source: Special tabulation of the 2014 Census data. ***Note***: TF = Total fertility rate. TMF = Total marital fertility rate.

Figure 2.4

Recent total marital fertility rates for Union and States/Regions, 2014 Census



Source: Table 2.2

2.5 Adolescent fertility

Table 2.3 shows adolescent fertility rates for the 12 months prior to the 2014 Census. The adolescent fertility rate is the age-specific birth rate for 15-19 year old women, typically multiplied by 1,000 for more convenient presentation. Adolescent fertility is of interest because births to very young women tend to have adverse health consequences for both the woman and the child.

It is to be expected that these health consequences will be more severe for younger adolescents, that is why the rates by single years of age shown in Table 2.3 are of interest. When rates are calculated from fertility surveys, sampling errors for single year rates will generally be unacceptably high, but this constraint does not apply to estimates from a population census.

The adolescent fertility rate for Myanmar during the year prior to the 2014 Census was 33 births per thousand women aged 15-19 years. Single year rates rise sharply over these ages, from 3 per thousand for 15 year old females to 53 per thousand for 19 year old females.

The rate varies substantially between urban and rural areas (22 and 38 per thousand, respectively) and between States and Regions, from a low of 21 per thousand for Yangon to a high of 59 per thousand for Shan.

Table 2.3

Adolescent fertility rates for Union, urban and rural areas, and States/Regions, 2014 Census

Adolescent fertility rates (births/1,000 women aged 15-19)						
Place	15-19	15	16	17	18	19
Union	33	3	11	21	35	53
Urban	22	2	7	13	21	32
Rural	38	3	12	22	36	55
Kachin	37	3	13	24	40	62
Kayah	38	2	12	24	40	62
Kayin	39	2	14	26	43	66
Chin	50	3	18	34	58	88
Sagaing	31	3	11	20	32	49
Tanintharyi	38	2	12	24	41	64
Bago	28	2	9	18	29	46
Magway	27	2	9	17	28	43
Mandalay	23	2	7	14	24	37
Mon	27	1	9	18	29	46
Rakhine	39	3	13	24	41	64
Yangon	21	2	7	13	21	32
Shan	59	7	23	41	63	91
Ayeyawady	40	3	13	26	42	64
Nay Pyi Taw	33	2	11	20	34	53

Source: Special tabulation of the 2014 Census data.

2.6 Estimates for Districts and Townships

Appendix B, Table B1 shows estimated age-specific birth rates and total fertility rates for the Union, urban and rural areas, the 15 States and Regions, the 74 Districts, and the 413 Townships of Myanmar. It also shows unadjusted and adjusted numbers of births, and adjustment factors. All estimates refer to the 12 months prior to the Census, April 2013 - March 2014.

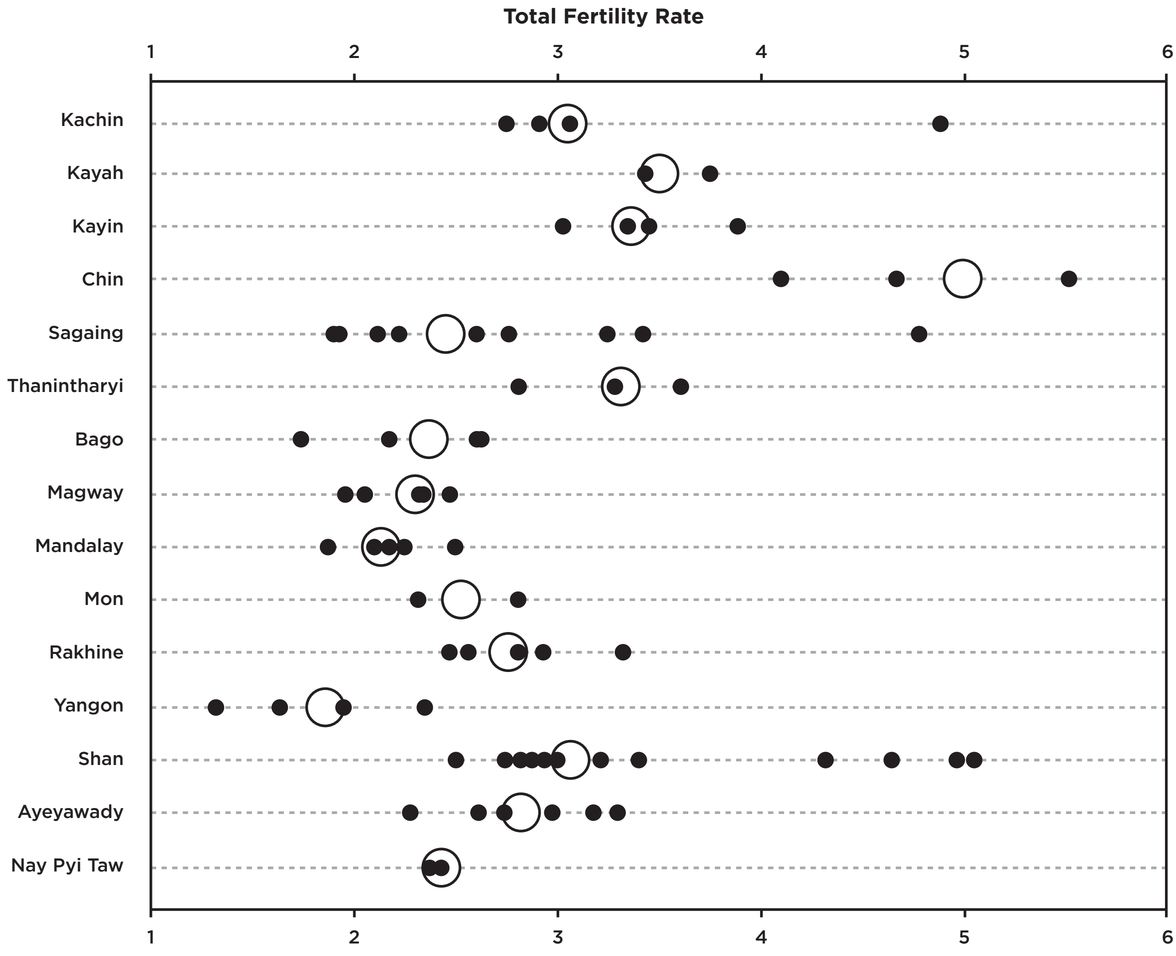
Figure 2.5 shows the District total fertility rates for each State/Region. The large, empty circles are values for the State or Region, while the black dots are values for the corresponding Districts. The aim of the plot is to show the large variability of fertility levels for Districts within the same State/Region. The inter-quartile range of the distribution of total fertility rates for Districts in Shan, for example, is 1.24 children per woman, while for Districts in Sagaing the range is 1.13 children per woman. Both are larger than the inter-quartile range at the State/Region level, but the range for Districts in Chin State is just 0.71 children per woman, only slightly less than the range for States and Regions.

2.7 Data quality and accuracy of estimates

Asking women how many times they have given birth during the last 12 months is the simplest approach to generate numbers of births to the population, but there are two potential problems that need to be considered in any census. Respondents will certainly know, with rare exceptions, whether or not a woman in the household gave birth in the recent past, but they may be uncertain about the precise date of birth, and therefore uncertain whether or not it occurred within the last 12 months. If this uncertainty leads respondents to report a birth only if they are sure that it occurred during the last 12 months, under-reporting of births is likely to occur.

Figure 2.5

Total fertility rates for States/Regions and Districts, 2014 Census



Source: Appendix B, Table B1.

Note: The large grey-filled circles are values for the State or Region. The black dots are values for Districts within the State or Region. States/Regions are ordered by the size of the inter-quartile range of the contained Districts.

The second potential problem is that enumerators, knowing (from knowledge about the area they are enumerating) which women may not have given birth during the last 12 months, may skip the question. The incidence of such enumerator bias may be expected to be higher if a positive answer requires the enumerator to ask follow-up questions, such as whether the birth was male or female and whether the child was surviving at the time of the Census.

Both problems suggest that births reported during the last 12 months are likely to be under-reported, and this expectation tends to be supported by experience. The practical question is what proportion of births may have been omitted. Answering this question requires statistical evidence. Much international evidence is available, for the question has been asked in many population censuses globally for over half a century, but such evidence tends to be contained in population census reports that are not always readily available.

It is not difficult to establish, however, that the level of omission may be very high. For the 2008 census of Cambodia, for example, about half of all births were not reported. Cambodia reported that a total fertility rate of 1.6 children per woman was calculated from births recorded during the 12 months prior to the 2008 census as compared with 2.7 to 3.4 children per woman after adjustment for omissions (National Institute of Statistics, 2009).

An alternative approach is to ask the month and year of the last birth. The responses are used to determine the number of these births that occurred during the 12 months prior to the Census. This question applies to all women with one or more child ever born, which is vastly larger than the number of women who gave birth during the year prior to the Census. Enumerators are less likely to omit the question, and it is easier for field supervisors to identify enumerators who do omit it. Respondents are obliged to answer the question in respect of all women who have become mothers, eliminating the option of a non-response if they are uncertain about when exactly the birth occurred. It is for these reasons that this alternative approach is often used in preference to the simpler direct question.

Births during the 12 months prior to the Census ascertained from month and year of last live birth may be too low for several reasons. A woman who has twins may report only one birth during the 12 months prior to the Census rather than two. However, this will not usually result in the omission of more than 1 to 2 per cent of total births.

If respondents tend to report the month and year of the last surviving birth, rather than the last live birth, some omission will also result. The magnitude of the omission depends on the level of the infant mortality rate. Given an infant mortality rate of 50 per 1,000 live births, for example, less than 5 per cent of last live births would be omitted even if the month and year of the last surviving birth was reported for every woman who gave birth during the 12 months prior to the Census.

If fertility information is obtained only for ever-married women, as in the Myanmar Census, any births to never married women will be omitted. The magnitude of this omission is expected to be small, not more than a few per cent. Note that responses to the children ever born question should, but may not, include children born when the mother was never married.

For these reasons, the number of births during the 12 months prior to a census calculated from the month and year of last birth information might be low by as much as five per cent, but even this high level of under-reporting appears unlikely in the case of the Myanmar Census. These reasons aside, there are no other obvious reasons for expecting calculated numbers of births to be too low rather than too high.

Some errors in the reporting of month and year of birth are to be expected, but it is not clear that combinations of the misreporting of month and year of birth that yield no births when there was in fact a birth are any more likely than combinations of month and year that yield a birth when in fact there was none.

Missing values of month and year of last birth were imputed, so missing value rates, which would provide an indirect indication of the quality of responses, could not be computed. However, it is not expected that this imputation would bias calculated numbers of births in either direction.

The preceding discussion refers to errors in the number of children born during the 12 months prior to the Census, but data quality depends also on the accuracy of responses to the children ever born questions. The expectation here is that, while reported numbers of children ever born may be too low, they are unlikely to be too high. There is no reason to suppose that reported numbers of children ever born for younger women in Myanmar are under-reported, but if they are, the adjustment factors in Table 2.1 and the fertility estimates would be too low.

The accuracy of the estimates depends also on the validity of the assumptions made by the indirect estimation procedure. Because the method used to produce the estimates in this report (see Appendix A) was developed specifically to make the assumptions as consistent as possible within the Myanmar context, errors from this source are expected to be less than would be the case if alternative methods were used.

The literature of indirect estimation tends to be prudently silent on the magnitude of errors due to invalidity of assumptions, but experience suggests that indirect estimates should not be expected to have an overall precision higher than about ±5 per cent relative error, perhaps slightly better if data quality is very high, and possibly much lower if data quality is poor. For total fertility estimates presented in this chapter this translates to errors of about ±0.1 or ±0.2 children per woman. This level of precision is probably sufficient for most practical purposes. Higher precision is unlikely to be supplied by anything other than a well-developed civil registration system.

Chapter 3. Trends in fertility

3.1 Introduction

The Census can provide information on the population as at the reference date, for the recent past, and to a more limited extent, on decades-long historical trends. For policy and programmatic purposes, information on the near-term future, although necessarily imperfect, is more important than information on the present. Information on future population trends is provided by population projections.

Anticipations of future fertility levels and trends are one of the most important inputs required for producing population projections. Information on recent fertility provides a starting point. Information on past levels and trends is equally important, however, because it provides a basis for anticipating future trends.

This chapter presents information on the trend in fertility in Myanmar since 1940 based on the 1983 census, the 1991 Population Changes and Fertility Survey, and the 1997, 2001 and 2007 Fertility and Reproductive Health Surveys.

3.2 Total fertility estimates, 1970-2014

Questions on births during the last 12 months were included in the 1983 census and the four nationally representative fertility surveys taken in 1991, 1997, 2001 and 2007. The inclusion of the questions in the fertility surveys, which also included full birth history, is unusual. From the 2001 and 2007 surveys it was possible to make special tabulations that allow for the application of the same estimation procedure that was used for the 2014 Census. For the earlier surveys, total fertility estimates are available in published reports, but it was not possible to make special tabulations. These data provide six total fertility estimates spanning the 31-year period 1982-2013.

Complete birth histories were collected by the 1991 Population Changes and Fertility Survey (PCFS) and the 1997, 2001 and 2007 Fertility and Reproductive Health Surveys (FRHS). The total fertility estimates presented in the reports vary. The 1991 PCFS provides estimates for four to five-year periods prior to the survey. The 1997 FRHS provides estimates for the five years prior to the survey only. The 2001 and 2007 surveys provide estimates for the year prior to the survey and for the three and five-year period prior to the survey, respectively.

The 1991 PCFS, which included a large household sample, provides own-children estimates for 15 single years prior to the survey and for the three five-year periods prior to the survey.

Table 3.1 presents these estimates together with the time periods to which they refer. Figure 3.1 plots the estimates at the midpoint of the period to which they refer. The time periods to which the survey birth history estimates refer are indicated by the horizontal lines through the plotted points. Survey estimates take the midpoint of the data collection period as the reference time. The data shows that estimates for the same, or nearly the same, point in time may differ by as much as half a child per woman or more.

The 1991 PCFS estimate based on births during the 12 months prior to the survey, for example, is 2.9 children per woman, but the estimate based on mean children ever born to women aged 50-54 at the time of the 2014 Census, which refers to a time only slightly later, is 3.6 children per woman (see section 3.4 on the use of mean children ever born to estimate period total fertility). The 1991 PCFS birth history estimate for the fourth five-year period prior to the survey is 5.5 children per woman, but the estimate based on mean children ever born to women aged 70-74 at the 2014 Census, which refers to a time only slightly earlier, is 4.85 children per woman.

The second of these discrepancies is probably explained by some combination of under-reporting of children ever born to women aged 70-74 at the time of the Census and mortality selection bias, but the first is almost certainly explained by a 1991 PCFS birth history estimate that is too low by about half a child per woman. The alternative explanation would be that mean children born to women aged 50-54 at the time of the 2014 Census is too high.

The own-children estimates are based mainly on the population age distribution and are, in this sense, independent of the estimates based on the fertility questions. They therefore provide important complementary evidence on the level and trend of fertility.

Despite these imperfections, the estimates plotted in Figure 3.1 give a reasonably clear picture of the long-term trend. Between the mid-1970s and late 1990s, fertility declined at an average rate of slightly over one child per woman per decade. From the late 1990s through to the 2014 Census, fertility was approximately constant. While there was probably some fluctuation in fertility between 2000 and 2010, the fluctuation suggested by the estimates is implausibly extreme. The evidence of errors in the estimates for 1970–2000 suggests that the variability in those for the later period reflects error as much as it reflects the true trend.

These changes are the so-called ‘stylized trend’ shown in Figure 3.1. The rate of decline for this trend, 1.3 children per woman per decade, is plausible in light of international experience. Feeney and Mason (2001) present rates of decline for nine East and Southeast Asian countries, eleven Latin American countries, and four Middle Eastern countries between 1960-64 and 1990-94. The median rates of decline are 1.5 children per woman per decade for the Asian countries, 1.3 children per woman for the Latin American countries, and 1.4 children per woman for the Middle Eastern countries.

Table 3.1

Total fertility estimates from multiple sources, 1976-2014

Source	Length of period	Midpoint of period	TFR
Births during the last 12 months			
2014 Census	1 year	2013.750	2.51
1983 Census	1 year	1982.747	4.73
1991 Population Changes and Fertility Survey	1 year	1990.542	2.91
1997 Fertility and Reproductive Health Survey	1 year	1996.336	2.72
2001 Fertility and Reproductive Health Survey (unadjusted)	1 year	2001.310	2.39
2001 Fertility and Reproductive Health Survey (adjusted)	1 year	2001.310	2.79
2007 Fertility and Reproductive Health Survey (unadjusted)	1 year	2006.545	2.03
2007 Fertility and Reproductive Health Survey (adjusted)	1 year	2006.545	2.38
Birth history estimates			
1991 Population Changes and Fertility Survey	5 years	1988.542	3.52
1997 Fertility and Reproductive Health Survey	5 years	1994.336	2.90
2001 Fertility and Reproductive Health Survey	5 years	1999.310	2.56
2001 Fertility and Reproductive Health Survey	3 years	2000.310	2.44
2001 Fertility and Reproductive Health Survey	1 year	2001.310	2.39
2007 Fertility and Reproductive Health Survey	5 years	2004.545	2.03
1991 PCFS own-children estimates			
1991 Population Changes and Fertility Survey 1986-90	5 years	1988.542	3.42
1991 Population Changes and Fertility Survey 1981-85	5 years	1983.542	4.38
1991 Population Changes and Fertility Survey 1976-80	5 years	1978.542	4.68
1991 Population Changes and Fertility Survey 1990	1 year	1990.542	2.86
1991 Population Changes and Fertility Survey 1989	1 year	1989.542	2.96
1991 Population Changes and Fertility Survey 1988	1 year	1988.542	3.68
1991 Population Changes and Fertility Survey 1987	1 year	1987.542	3.77
1991 Population Changes and Fertility Survey 1986	1 year	1986.542	3.93
1991 Population Changes and Fertility Survey 1985	1 year	1985.542	4.34
1991 Population Changes and Fertility Survey 1984	1 year	1984.542	4.43
1991 Population Changes and Fertility Survey 1983	1 year	1983.542	4.39
1991 Population Changes and Fertility Survey 1982	1 year	1982.542	4.35
1991 Population Changes and Fertility Survey 1981	1 year	1981.542	4.41
1991 Population Changes and Fertility Survey 1980	1 year	1980.542	4.80
1991 Population Changes and Fertility Survey 1979	1 year	1979.542	4.27
1991 Population Changes and Fertility Survey 1978	1 year	1978.542	5.04
1991 Population Changes and Fertility Survey 1977	1 year	1977.542	4.59
1991 Population Changes and Fertility Survey 1976	1 year	1976.542	4.71

Sources: ***Births during the last 12 months:*** *2014 Census*: Table 2.2. *1983 Census*: Ministry of Home and Religious Affairs (1986) page 1-37. *1991 PCFS*: Ministry of Immigration and Population (1995), Table 4.10, page 46. *1997 FRHS*: Department of Population (1999), Table 4-3, page 43. *2001 FRHS*: Department of Population (2003), Annex Table B.4. *2007 FRHS*: Department of Population (2009), Table 4.3, page 60. The 2014 Census *Union Report: Census Report Volume 2* shows a TFR estimate of 2.3 children/woman (Table 16, page 36).

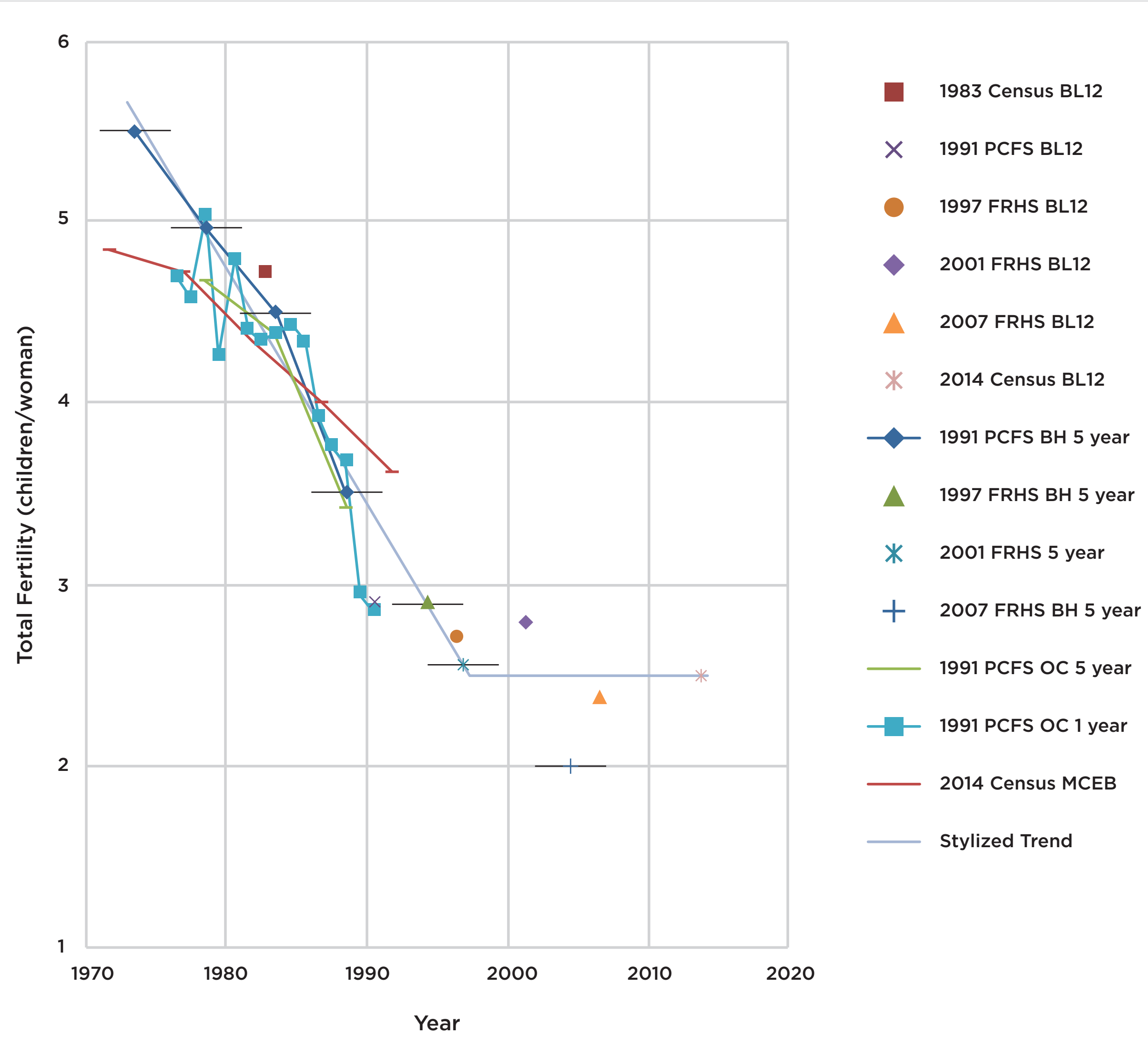
Birth history estimates: *1991 PCFS:* Ministry of Immigration and Population (1995), Table 4.7, page 39. *1997 FRHS*: Department of Population (1999), Table 4-5, page 45. *2001 FRHS*: Department of Population (2003), Table 3.5, page 51. *2007 FRHS*: Department of Population (2009), Table 4.5, page 63.

Own-children: Ministry of Immigration and Population (1995), Table 4.8, page 41.

Note: TFRs are shown as they appear in the source reports; the number of places after the decimal point has not been changed. Different estimates refer to time periods of different lengths. Estimates based on births during the 12 months prior to the survey are based on reported births unless otherwise noted. Surveys are located in calendar time at the midpoint of the data collection period.

Figure 3.1

Total fertility estimates from multiple sources, 1976-2014



Source: Table 3.1

Notes: Estimates plotted at midpoint of period to which estimate refers. FRHS estimates for 5-year periods are plotted with horizontal lines to indicate the reference period.

3.3 Fertility trend from the population age distribution

Fertility trends may be estimated from the population age distribution provided by the Census. Persons at each single year of age are the survivors of persons born during a particular year in the past. If numbers of deaths and international migrants can be estimated, the numbers of births can be calculated and used to estimate fertility in the past. Estimates of past fertility levels calculated in this way are referred to as 'reverse survival' estimates. Methods for producing these include basic reverse survival (Spoorenberg, 2014a), the own-children method (Cho et al, 1984) and birth history reconstruction (Luther and Cho, 1988).

As noted in Chapter V of the United Nations *Handbook on the Collection of Fertility and Mortality Data* (2004), the accuracy of reverse survival estimates is a direct reflection of the accuracy of the population age distribution (paragraph 399). The accuracy of the 2014 Myanmar Census age distributions was scrutinized closely during preliminary work for producing population projections.

The examination showed that reported numbers of persons 0-4 years of age are about 5 per cent too low for the Union of Myanmar as a whole. The estimate of deficit is made by estimating the number of persons aged 0-4 using the estimated age-specific fertility rates in Table 2.2 and the age distribution of females of reproductive age.

Given the evidence of errors in the 2014 Census population age distribution below age 20, and the evidence available from previous data collection operations, it was decided that reverse survival estimates based on the 2014 Census would not yield useful additional information, particularly since comparisons with estimates from a recent census could not be made.

3.4 Fertility trend from children ever born data, 1940-1990

Demographer Norman B Ryder observed over half a century ago that completed fertility for women in a birth cohort may be regarded as an estimate of the total fertility rate at the time the cohort reached its mean age at childbearing (Ryder, 1960).

Table 3.2 shows the mean number of children ever born for post-reproductive age women for the 2014 Census, the 1983 census, and the 1991 Population Changes and Fertility Survey. Applying Ryder's observation to mean children ever born to women aged 50-54 at the 2014 Census, 3.63 children per woman provides an estimate of total fertility at the time women in this cohort reach the cohort mean age at childbearing.

This time may be calculated by subtracting the mean age at childbearing, which may be estimated as 30 years (Feeney, 1995), from the mean age of 50-54 year old women, which may be approximated to be 52.5 years. This shows that members of the cohort reached their mean age at childbearing 52.5 - 30 = 22.5 years prior to the Census. The Census reference time in decimal form is 2014.25, so the cohort reached its mean age at childbearing at time 2014.25 - 22.5 = 1991.75. This is the value shown in the first row of the 'Time' column for the 2014 Census in Table 3.2. Other times in the table are calculated in the same way.

Table 3.2

Time plot of mean number of children ever born to women aged 50 and over at the time of the 1983 Census, the 1991 Population Changes and Fertility Survey, and the 2014 Census, with year cohort reached age 30 years

	1983 Census		1991 PCFS		2014 Census	
Age	Time	MCEB	Time	MCEB	Time	MCEB
50-54	1960.8	5.11	1968.6	5.30	1991.7	3.63
55-59	1955.8	4.82	1963.6	5.31	1986.7	4.02
60-64	1950.8	4.32	1958.6	5.06	1981.7	4.35
65-69	1945.8	4.08	1953.6	4.75	1976.7	4.73
70-74	1940.8	3.69	-	-	1971.7	4.85
75-79	-	-	-	-	1966.7	4.90
80-84	-	-	-	-	1961.7	4.62
85-89	-	-	-	-	1956.7	4.39

Source: 2014 Census: Calculated from Department of Population (2015) Table F-1, p.194. *1991 PCFS*: Ministry of Immigration and Population (1995), Tables 4.3 and 4.4, pages 34-35.

Note: Time calculated as census reference time minus midpoint of age group plus mean age at childbearing, taken to be 30 years.

Figure 3.2 plots the completed fertility estimates from the three sources. The right most point for each series is the mean number of children ever born to women aged 50-54 years. Points to the left in the series are for successively older cohorts. The plotted series may be referred to as 'time plots' of the mean number of children ever born data to distinguish them from plots of the same data by age of mother.

Time plotting of children ever born data was introduced by Feeney (1988) and applied to the data on children ever born from the 1962, 1969 and 1979 censuses of Kenya, and subsequently to children ever born data for Thailand, Japan, the Republic of Korea, and the United States (Feeney, 1991, 1994, 1995). The method may be applied to other life cycle events as well. A recent application to literacy data is given in Feeney (2014).

Figure 3.2 suggests that total fertility in Myanmar rose during the period 1940 to 1965 and fell between 1965 and 1990. The decline after 1965 is qualitatively consistent with that shown in Figure 3.1. The evidence of rising fertility before 1965 is of interest because total fertility estimates are not available from other sources.

Critical interpretation requires consideration of the quality of the total fertility estimates from the mean children ever born data. The demographic literature tends to presume deteriorating completeness of reporting with increasing age in post-reproductive ages. This may be due to the suggestion (Brass and Coale, 1971, page 11) that deteriorating completeness of reporting may be assumed unless it was known that fertility was lower in the past in the population being analysed.

Subsequent work has shown that declines in mean children ever born with increasing age may in fact indicate rising fertility in the past (Feeney, 1988, 1991, 1995). If data are available from only one census, there may be little basis for assessing the accuracy of the data for older women. When data are available from two or more successive censuses, however, cohort comparisons provide a simple test for deteriorating completeness of reporting with increasing age. Time plots provide a convenient visual interpolation when intercensal intervals are not multiples of five years, as is the case for Myanmar.

Consider, for example, the plots for the 1983 census and the 1991 PCFS in Figure 3.2. The rightmost point in both series is the mean number of children ever born for women aged 50-54 years. The points to the left are mean values for older age groups. If the rise of the plotted points over time reflects deteriorating completeness of reporting of children ever born with increasing age of mother, it would be expected that the points for older women in the 1991 PCFS would lie below the points for younger women in the 1983 census. The near coincidence of the two series where they overlap suggests that the explanation for declining mean children ever born values with increasing age is rising fertility in the past.

The 1991 estimates are slightly higher than the 1983 estimates, despite the cohorts being eight years older. The comparison indicates that the decline in mean children ever born with increasing age in the 1991 PCFS and the 1983 census reflect rising fertility during the 1950s and early 1960s, not deteriorating completeness of reporting of children ever born.

This is not to say that no deterioration of completeness of reporting of children ever born occurs with the increasing age of the mother. Close scrutiny of the time plot for the 1983 census suggests that there may be substantial under-reporting for women aged over 60 years. It is plausible that completed fertility around 1940 was higher than 3.7 children per woman. It is equally plausible, however, that the level of fertility at this time would have been depressed by World War II, especially due to high mortality during and after the war.

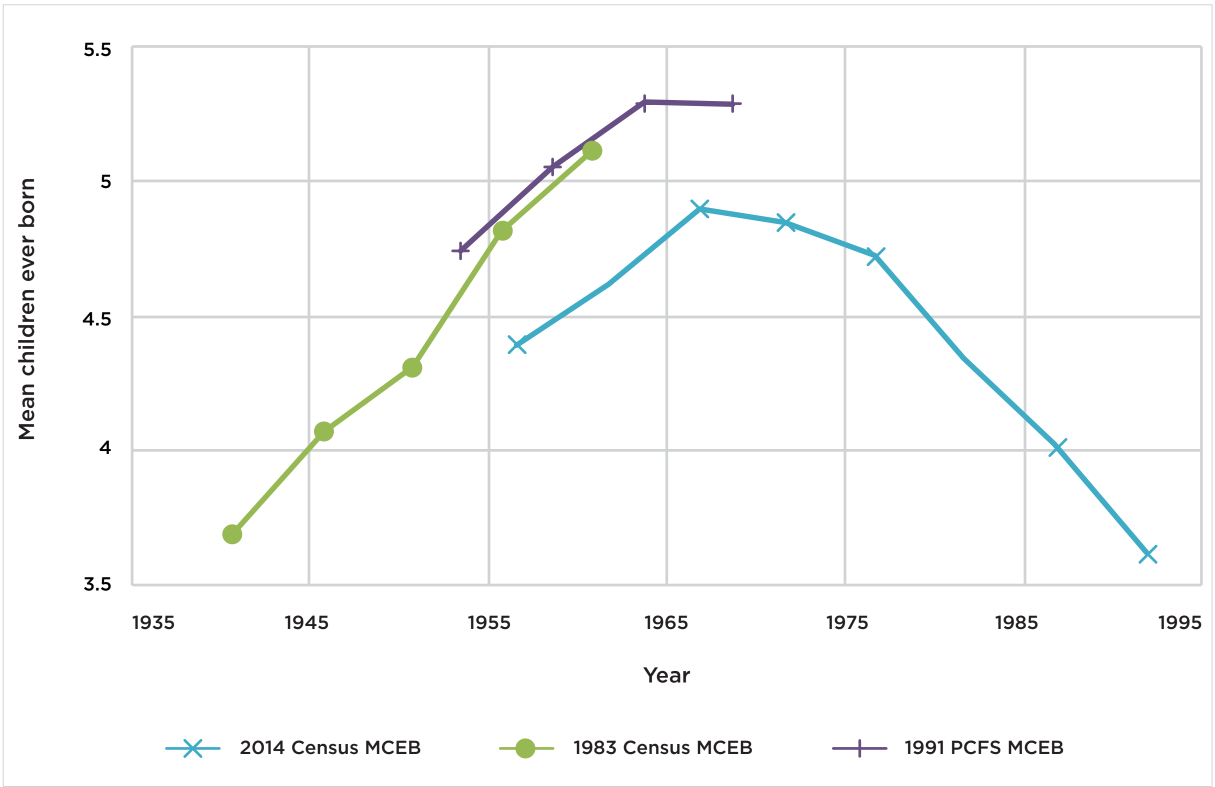
Comparison of estimates based on the mean number of children ever born to women aged 70-74 to 85-89 years at the time of the 2014 Census with the 1991 PCFS estimates likewise suggests that the 2014 estimates for these (very) old women are low by about half a child per woman.

It is plausible that fertility rose from around 1940 through to the mid-1960s, partly as a result of the fertility-depressing effect of war-time conditions, but equally because rising fertility is not uncommon during the early stages of the demographic transition (Dyson and Murphy, 1985).

Taken together, the plots suggest that the level of fertility in Myanmar rose from about four and a half children per woman around 1950 to about five and a half children per woman during the mid-1960s and then declined to about three and a half children per woman around 1990.

Figure 3.2

Time plot of mean number of children ever born to women aged 50-54 and over, 1983 Census, the 1991 Population Changes and Fertility Survey, and the 2014 Census, Myanmar.



Source: Table 3.2

Chapter 4. Marital Status

4.1 Introduction

No aspect of human society is more fundamental than the cultural, social and legal institutions that govern reproduction. Marriage, the primary institution, governs the creation of marital unions, their maintenance, and their dissolution by divorce. Dissolution of marriages by death of one of the partners cannot be controlled by the institution, but the institution may prescribe behaviour for the surviving spouse and other relatives.

In the context of this report "marriage" as an institution subsumes not only the demographic event that creates a new marital union, but also the union created by this event and any subsequent event that causes the dissolution of a union by divorce. Marriage thus has three distinct meanings: the social institution, the demographic event, and the union of two persons created by the event. "Divorce", likewise, refers both to the social institution governing divorces and the event that dissolves a marriage without the death of either partner.

Marriage and divorce events may be used to define classifications of "marital status". Marriage moves a person from a "not married" to a "married" status, while divorce moves a married person in the opposite direction. The term "single" may be commonly understood to be synonymous not only with those persons that are "not married", but also with those who are "never married", so the more explicit term never married is preferred here.

Because persons may marry and divorce more than once, complex categorizations may be defined. A categorization might distinguish, for example, between persons in their second marriage following a divorce, and persons in their second marriage following the dissolution of their first marriage by the death of their spouse. Census marital status classifications generally do not include sub-categories defined by multiple marriages and divorces.

Marital status classifications in population censuses often include a "separated" category of persons who, though married, do not cohabit, or have conjugal relations with their spouse. "Separation" may be a legally defined event or an informal understanding between the parties to the marriage.

This chapter presents and analyses information collected on marital status from the 2014 Census. It also presents and analyses age-specific proportions of persons never married at the time of the 2014 Census with corresponding proportions from the 1983 and 1973 censuses, the 1991 Population Changes and Fertility Survey, and from the 1997, 2001 and 2007 Fertility and Reproductive Health Surveys.

4.2 Age patterns of marital status at the 2014 Census

The 2014 Census collected information on marital status from all persons, including persons in institutional households. The 1983 and 1973 censuses collected this information only for persons aged 10 and over. Fertility information, as noted in Chapter 2, was collected only for ever-married women in conventional households.

Five marital status categories are defined: never married, married, widowed, divorced or separated, and renounced. The first four are the standard categories used internationally, but the last is not. Maung notes that: "A marriage may be dissolved through 'renouncement' - that is, entrance of the husband into the Buddhist priesthood" (Maung, 1986). The 2014 Census data indicated that marriages may also be dissolved by women entering the Buddhist priesthood.

Table 4.1

Age-specific proportions of persons aged 15 years and over by sex and marital status, 2014 Census

	Percentages					
Sex/age	**Total**	**Never married**	**Married**	**Widowed**	**Divorced/ Separated**	**Renounced**
Males						
15-19	100	92.44	4.43	0.09	0.15	2.90
20-24	100	66.96	30.41	0.15	0.72	1.75
25-29	100	38.96	58.03	0.30	1.22	1.50
30-34	100	22.61	73.95	0.55	1.67	1.21
35-39	100	14.51	81.32	0.92	1.97	1.28
40-44	100	10.55	84.59	1.50	2.04	1.31
45-49	100	08.31	85.88	2.33	1.98	1.50
50-54	100	6.98	85.68	3.81	1.88	1.64
55-59	100	5.71	84.98	5.67	1.72	1.91
60-64	100	4.79	82.26	8.95	1.53	2.47
65-69	100	3.94	78.67	12.78	1.38	3.23
70-74	100	3.63	71.69	19.72	1.25	3.71
75-79	100	3.25	63.45	27.83	1.11	4.36
80-84	100	3.52	54.02	37.10	0.96	4.41
85-89	100	3.69	45.03	45.93	0.92	4.42
90+	100	4.81	38.97	50.90	0.73	4.58
Females						
15-19	100	86.81	12.42	0.15	0.41	0.21
20-24	100	54.53	43.62	0.36	1.36	0.13
25-29	100	31.97	65.07	0.83	2.00	0.13
30-34	100	20.82	74.84	1.74	2.47	0.13
35-39	100	16.25	77.66	3.22	2.73	0.15
40-44	100	14.06	77.27	5.68	2.81	0.17
45-49	100	12.88	74.91	9.15	2.86	0.20
50-54	100	11.95	70.31	14.74	2.76	0.25
55-59	100	10.80	64.85	21.45	2.61	0.30
60-64	100	9.73	57.02	30.65	2.23	0.37
65-69	100	8.39	49.16	40.17	1.82	0.45
70-74	100	7.37	39.20	51.56	1.37	0.49
75-79	100	6.60	31.32	60.53	1.00	0.54
80-84	100	6.46	23.71	68.49	0.78	0.55
85-89	100	6.22	18.48	73.96	0.75	0.59
90+	100	6.39	16.10	76.15	0.66	0.70

Source: Special tabulation of the 2014 Census.

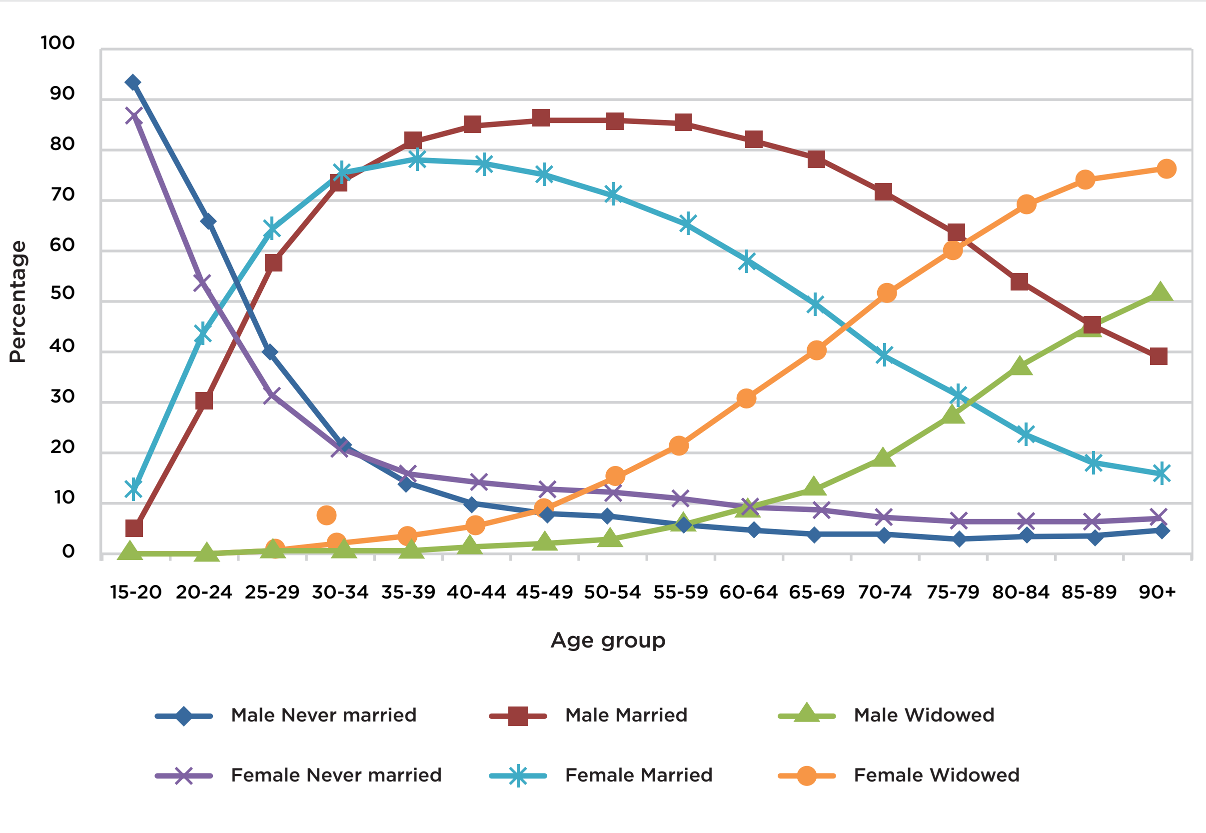
Table 4.1 shows the proportion of persons, for both males and females and each five-year age group, in each of the five marital status categories. The percentages shown are for all persons enumerated in the Census, including persons living in institutional households. The marital status tables in the main census report (Department of Population, 2015) provide distributions by sex and age only for persons living in conventional households.

Proportions of divorced or separated persons were less than 3 per cent for females in all age groups, and less than 2 per cent for males in all age groups except 40-44 years, for which the percentage was only 2.04. Proportions renounced among women were even lower, less than 1 per cent in all age-groups.

Figure 4.1 plots age-sex patterns for never married, married, and widowed males and females. The male-female differences are striking. Below age 35, proportions of never married women were lower than proportions of never married men, corresponding to an earlier age at marriage for females.

Figure 4.1

Age-sex patterns of persons aged 15 years and over by marital status, 2014 Census



Source: Table 4.1

The singulate mean age at marriage for women was 23.6 years, compared with 25.9 for men, an age difference of 2.3 years (see Table 4.2 below).

After age 35, however, the proportions of never married females rise above males. The percentage of females aged 50-54 (12.4 per cent) was much higher than the corresponding percentage for males (7.6 per cent). This difference is discussed further in section 4.4 below.

The male-female differences for currently married and widowed are even more striking. For the first three age groups, ages 15-29, the proportions of males who are married fall below the female proportions, in line with the differences in proportions who are never married. Proportions widowed in these age groups are very small.

After age 35, however, the proportions of males married greatly exceed the female proportions. For the last age group shown in the plot, 45 per cent of males were married, compared with only 18 per cent of females. Correspondingly, 74 per cent of females aged 85-89 were widowed, compared with only 46 per cent of males. These sex differences reflect the large sex mortality differential in Myanmar (Department of Population, 2016a).

4.3 Changing proportions married and mean age at marriage, 1973-2014

Table 4.2 shows data on the proportions of persons, by sex and age, who were never married from the 1973, 1983 and 2014 censuses, and the 1991, 1997, 2001, and 2007 surveys. The last rows of the table show: the proportion of never married persons at exact age 50 years, estimated as the average of the proportions never married in the 45-49 and 50-54 age groups; the singulate mean age at marriage (SMAM) (see Hajnal, 1953); and the change in SMAM from one data collection operation to the next.

The table shows, in particular, a sharp drop in the mean age at first marriage (SMAM) for females between the 2007 survey and the 2014 Census, from 26.15 to 23.59 years, a decline of 2.76 years over the seven years between the two data sets. This decline is surprising, because: mean age at marriage generally increases as fertility declines; the decline reverses a three-decade upward trend; and because the magnitude is so extreme.

Further scrutiny of Table 4.2 shows, firstly, that the mean ages based on the surveys are substantially higher than the mean ages based on the censuses, and secondly, that, for ages under 50 years, the proportions never married from the surveys are substantially higher than the proportions from the censuses. Interestingly, this difference between the census and survey proportions is not observed over age 50.

The magnitude of the SMAM difference may be gauged by averaging the differences between (a) the mean ages calculated from the surveys, and (b) the mean ages interpolated between the values for the 1983 and 2014 censuses (the interpolated values are 22.68 (1991), 22.86 (1997), 22.99 (2001) and 23.17 (2007). The average difference is 2.7 years.

Table 4.2

Percentage of population aged 10 and over never married, and singulate mean age at marriage by sex, by age, various sources

	Age	1973 Census	1983 Census	1991 PCFS	1997 FRHS	2001 FRHS	2007 FRHS	2014 Census
Males	10-14	98.37	97.91	99.99	99.90	99.80	99.70	-
	15-19	92.24	93.29	96.70	97.80	97.40	95.90	92.44
	20-24	55.24	60.10	69.89	76.70	75.40	76.70	66.96
	25-29	23.73	28.14	37.57	46.10	46.40	48.60	38.96
	30-34	10.35	12.72	19.56	23.50	25.40	27.00	22.61
	35-39	6.07	7.15	11.40	14.20	15.30	15.80	14.51
	40-44	4.39	4.84	6.21	8.90	9.10	10.40	10.55
	45-49	3.51	3.77	4.32	5.70	5.70	7.50	8.31
	50-54	3.17	3.29	3.57	4.00	4.20	5.50	6.98
	55-59	2.98	2.84	3.95	2.80	3.30	4.30	5.71
	60-64/60+	2.92	2.66	2.90	2.70	2.60	2.50	4.79
	65-69/65+	2.87	2.58	3.15	-	-	-	3.94
	70-74	2.83	-	2.42	-	-	-	3.63
	75-79/75+	2.72	-	1.17	-	-	-	3.25
	80-84	2.98	-	-	-	-	-	3.52
	85-89/85+	3.33	-	-	-	-	-	3.69
	90+	-	-	-	-	-	-	4.81
	PNM50	3.34	3.53	39.5	4.85	4.95	6.50	7.65
	SMAM	23.90	24.60	26.35	27.6	27.56	27.63	25.87
	Change	-	0.70	1.75	1.21	0.07	0.01	-1.77
Females	10-14	99.61	99.66	99.91	99.90	99.90	99.90	-
	15-19	78.03	83.15	89.27	93.40	91.60	92.80	86.81
	20-24	35.51	42.06	56.04	65.20	64.90	67.90	54.53
	25-29	16.65	21.55	32.39	40.60	40.80	43.20	31.97
	30-34	9.30	12.85	19.57	24.70	25.90	29.00	20.82
	35-39	6.97	8.91	13.81	17.00	18.60	21.40	16.25
	40-44	6.24	6.74	10.43	14.70	14.80	17.30	14.06
	45-49	5.86	5.93	9.11	12.10	11.80	14.80	12.88
	50-54	5.69	5.88	6.53	7.80	9.90	11.80	11.95
	55-59	5.80	5.79	6.32	6.60	7.70	9.50	10.80
	60-64/60+	5.72	6.08	7.19	6.70	5.90	6.90	9.73
	65-69/65+	5.94	6.21	6.62	-	-	-	8.39
	70-74	5.55	-	6.10	-	-	-	7.37
	75-79/75+	5.14	-	6.10	-	-	-	6.60
	80-84	4.29	-	-	-	-	-	6.46
	85-89/85+	3.76	-	-	-	-	-	6.22
	90+	-	-	-	-	-	-	6.39
	PNM50	5.78	5.91	7.82	9.95	10.85	13.30	12.42
	SMAM	21.27	22.43	24.54	26.00	25.79	26.15	23.59
	Change	-	1.16	2.11	1.46	-0.20	0.35	-2.76

Sources: *1973 Census*: Calculated from Table 10, pages 96-98, of *Burma 1973 Population Census* [in Burmese]. *1983 Census*: Ministry of Immigration and Population (1986), Table 9, pages 2-45/46. *1991 PCFS*: Ministry of Immigration and Population (1995), Table 3.1, page 19. *1997 FRHS*: Department of Population (1999), Table 3.1, page 27. *2001 FRHS*: Department of Population (2003), Table 2.12, page 30. *2007 FRHS*: Department of Population (2009), Table 3.1, page 44. *2014 Census*: Calculated from Department of Population (2015), Table B2, page 119.

Note: SMAM = Singulate mean age at marriage. PNM50 = Proportion never married by age 50 years, estimated as the average of the proportions never married at ages 45-49 and 50-54.

Evidence from many countries suggests that fertility surveys may tend to selectively omit never married women, resulting in proportions never married that are biased low (Avery et al, 2013; Festy and Prioux, 2002; Hartanto and Hull, 2009; Hull and Hartanto, 2009; Spoorenberg, 2014b). In striking contrast, it appears that the Myanmar surveys are giving proportions never married that are too high. Accepting the census proportions never married as more reasonable than the survey values, we conclude that the apparent decline of the SMAM between the 2007 FRHS survey and the 2014 Census is spurious, that the true trend of age at marriage increased more or less steadily over the period.

Male age at marriage exceeds female age at marriage by about two years on average. The tendency of the survey estimates to lie above the census estimates is less pronounced for males than it is for females. The average difference between the survey values and the values interpolated between the 1983 and 2014 censuses is 2.0 years, as compared with 2.7 years for females.

4.4 Never married women in Myanmar, 1914-2014

Table 4.1 shows a remarkably high proportion of women never married at the end of their reproductive age span, 12 per cent for women aged 50-54, but this high value is a relatively recent development. Table 4.2 shows that the proportion who were never married at age 50 more than doubled between 1983 and 2014, rising from 5.9 to 12.4 per cent. The same pattern is shown for men, although the levels are lower.

Table 4.3 compares the proportion of women who were never married in Myanmar with 14 other countries in Asia using data from the 2010 round of censuses. The proportions for Myanmar are generally much higher for all ages over 50 than the proportions for 13 of the 14 other countries shown, and significantly higher than the proportions for Japan and Thailand. Only Singapore, a highly developed country with very low fertility, has a higher proportion than Myanmar in the age groups 50-64. The proportions for women aged 50-54 are plotted in Figure 4.2.

The primary purpose of this report is to present the results of the 2014 Census together with information on data quality and accuracy required to interpret the results. Explanation is another matter, and is, for the most part, out of the scope of this report. However, the unusually high proportion of never married women in Myanmar calls for some explanation, however brief and inadequate.

Table 4.3

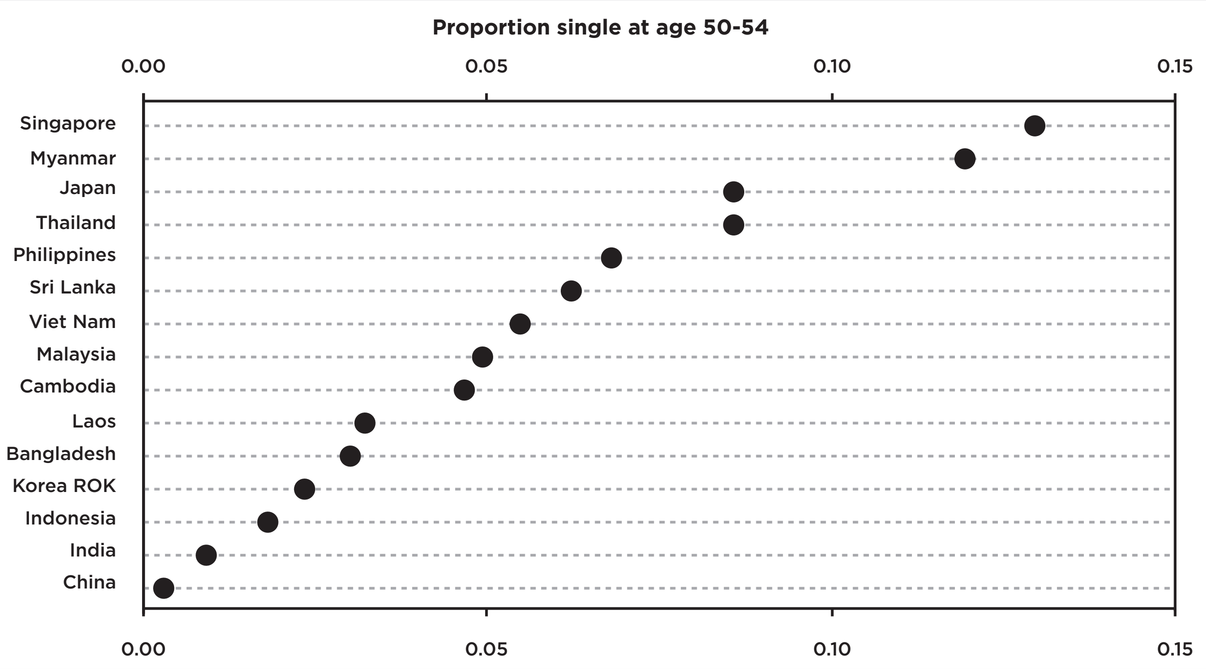
Percentages of females who were never married at ages 50-89, selected Asian countries, 2010 round of censuses

Country	Year	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89
Singapore	2010	12.98	11.80	9.80	6.12	5.05	3.48	2.34	-
Myanmar	**2014**	**11.95**	**10.80**	**9.73**	**8.39**	**7.37**	**6.60**	**6.46**	**6.22**
Japan	2010	8.57	6.43	5.45	4.44	3.95	3.96	3.97	3.20
Thailand	2010	8.55	7.87	7.00	6.05	5.44	4.92	4.61	-
Philippines	2010	6.78	6.73	7.25	7.14	7.60	8.40	9.26	9.79
Sri Lanka	2001	6.22	5.48	4.67	3.80	3.62	-	-	-
Viet Nam	2009	5.49	5.13	-	-	-	-	-	-
Malaysia	2010	4.95	4.47	5.07	5.35	3.89	-	-	-
Cambodia	2008	4.67	3.92	3.59	2.92	3.23	-	-	-
Laos	2005	3.22	3.05	2.99	2.87	3.12	3.28	3.00	3.11
Bangladesh	2001	3.02	3.20	4.65	5.18	-	-	-	-
Korea ROK	2010	2.35	1.76	1.18	0.85	0.64	-	-	-
Indonesia	2010	1.82	1.68	1.49	1.22	1.07	0.96	0.94	0.91
India	2001	0.91	0.70	1.08	1.19	1.51	1.74	-	-
China	2010	0.30	0.25	0.24	-	-	-	-	-

Sources: UNSD, 2014a, (http://unstats.un.org/unsd/demographic/products/dyb/dybcensusdata.htm) Population by marital status, age, sex and urban/rural residence.

Figure 4.2

Proportions of women never married at age 50-54: selected Asian countries, 2010 round of censuses



Source: Table 4.3

The Census data supports the assertion that many women remain never married, but the data can provide little by way of explanation for why never married women are as common as the data shows. The 2014 Census data, together with data from the 1973 and 1983 censuses, and from the 1991 Population Changes and Fertility Survey, do however provide information that may be useful for any future analysis to better understand the reasons for this behaviour.

Table 4.4 shows the proportions of never married women for women of post-reproductive age from the 1973, 1983 and 2014 censuses, and the 1991 Population Changes and Fertility Survey. The 1991 PCFS data are included because the survey covered a large enough household sample for a comparison to be valid.

At the time of the 1983 census and the 1991 survey, the proportions of women never married were more or less constant over the age of 50. The data from the 2014 Census, however, shows that the proportions of never married women has fallen sharply, from 12 per cent for women aged 50-54 to 6 per cent for women aged 85-89. Proportions of never married women decline with increasing age for younger women (Table 4.2) because they are in the process of marrying, but marriages of women over age 50 are far too uncommon to explain this decline.

The most likely explanation comes from observing that the 85-89 year old married women had married, on average, about 60 years before the Census, whereas married women aged 50-54 had married 20 years before the Census. Beyond the reproductive age span, declining proportions married as age increases reflects increasing proportions married in the past. Age is the nominal variable, but the real variable is historical time.

These observations may be sharpened and visualized by imagining that all women marry at the same age m, so that marriages of women age x at the time of the Census occurred $x-m$ years prior to the Census. The proportion of never married for women age x at the Census taken at time t may then be plotted against time $t - x + m$. The result is a 'time plot' of proportions never married, so called to distinguish it from a plot of the proportions against age.

The assumption that all women marry at exactly the same age is unrealistic - it serves only to illustrate the idea of locating marriages in historical time easier. Given a distribution of ages at first marriage within the cohort, m may be understood to refer to the mean age at first marriage for women who marry. The plot is constructed in the same way, but using proportions never married only for ages beyond which the frequency of marriage is negligible.

When data is available from two or more censuses and/or surveys, as it is for Myanmar, the consistency of the plots from successive censuses and surveys provide a way of validating the assumptions on which the plots are based, and on the quality of the data from each data collection operation.

Table 4.4

Percentages never married for post-reproductive age women, 1973, 1983 and 2014 censuses; 1991 Population Changes and Fertility Survey

	1973 Census		1983 Census		1991 PCFS		2014 Census	
Age	Year	PNM	Year	PNM	Year	PNM	Year	PNM
50-54	1943.25	5.69	1953.25	5.88	1961.042	6.53	1984.25	1.95
55-59	1938.25	5.80	1948.25	5.79	1956.042	6.32	1979.25	10.80
60-64	1933.25	5.72	1943.25	6.08	1951.042	7.19	1974.25	9.73
65-69	1928.25	5.94	-	-	1946.042	6.62	1969.25	8.39
70-74	1923.25	5.55	-	-	1941.042	6.10	1964.25	7.37
75-79	1918.25	5.14	-	-	-	-	1959.25	6.60
80-84	1913.25	4.29	-	-	-	-	1954.25	6.46
85-89	-	-	-	-	-	-	1949.25	6.22

Source: Table 4.2

Note: PNM = Proportion (expressed as a percentage) never married.

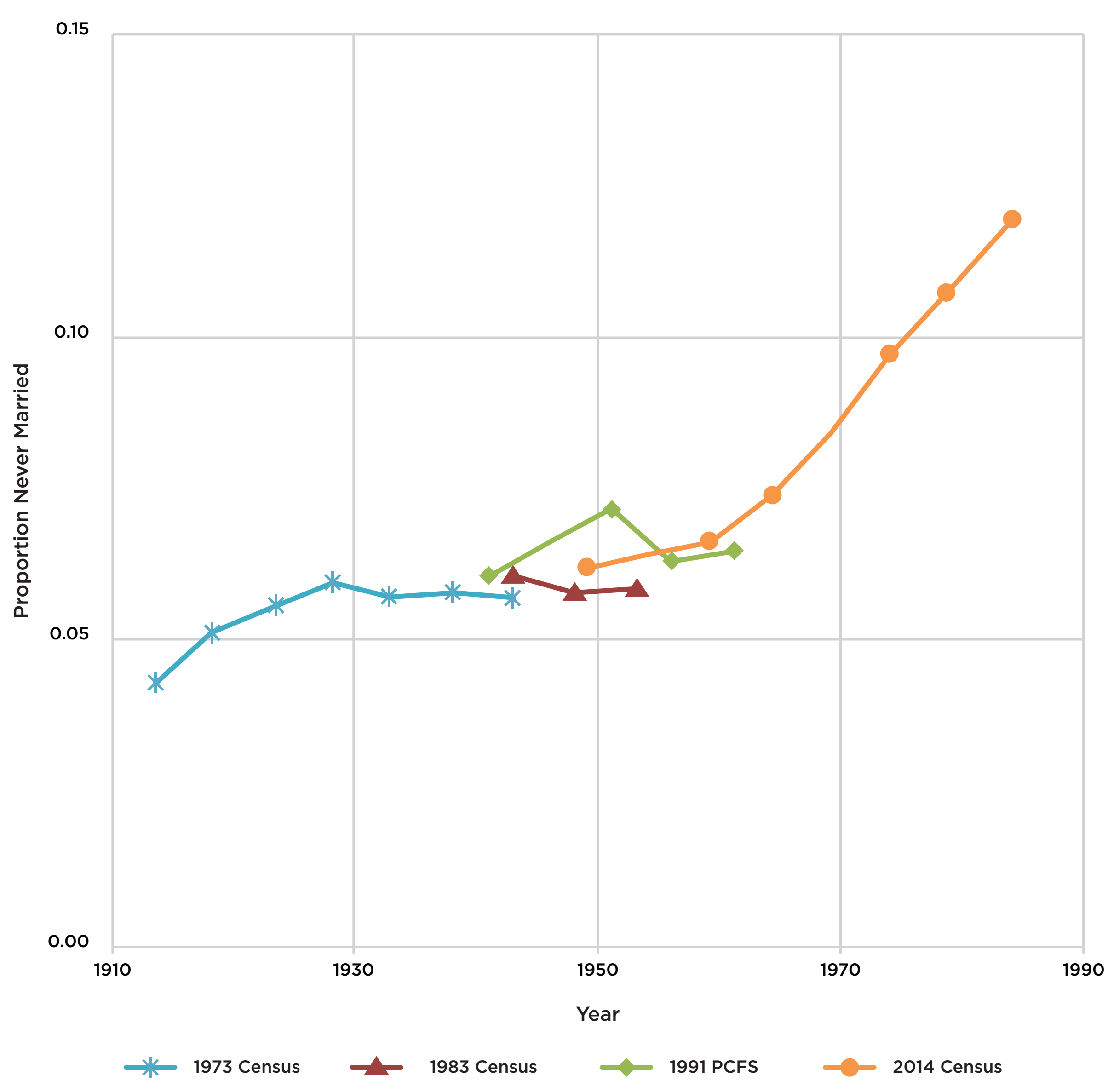
Figure 4.3 plots the proportions never married shown in Table 4.4. The years in the table are calculated on the assumption that mean age at marriage in all birth cohorts is 22.5 years. More precise calculations might be attempted using the mean age at marriage values in Table 4.2, but it is easy to see that essential features of the plot would not be affected. Using a different mean age at marriage for a series would shift the series to the right or to the left by, at most, a few years, based on the variability in mean age at marriage shown in Table 4.2. Given the long historical perspective of the plot, the effect is negligible.

If only the 2014 Census data were available, the interpretation of the rising proportions never married between 1950 and the early 1990s in Figure 4.4 might be doubtful. It might be suspected that the decline results from increasing response error with the increasing age of women, for example, or from higher mortality for never married women than for ever-married women. The consistency of the four time plots for the period 1940-1960 indicates that response error and mortality selection bias, although doubtless present, are secondary influences. The proportion of never married women before 1960 was not unusual in relation to the proportions shown in Figure 4.3. The simple conclusions to be drawn from Figure 4.3 is that the percentage of never married women in Myanmar began to rise around 1960 and it nearly doubled between 1960 and 1985, from about 6 to 12 per cent.

The methodology displayed in Table 4.4 and Figure 4.3 was applied in section 3.4 to infer historical fertility trends from mean children ever born to post-reproductive age women. It may be applied to any event that persons can experience, although the results are most useful when the distribution of the event within birth cohorts is reasonably stable over time, and when the distribution about the mean is more, rather than less, concentrated. A recent application to century long trends in literacy is given in Feeney (2014).

Figure 4.3

Time plots of proportions never married for women aged 50 and over, 1973, 1983 and 2014 censuses and 1991 Population Changes and Fertility Survey



Source: Table 4.4

4.5 Widows with children

Given the high proportions of widowed women, it is of interest to know how many surviving children they have. Table 4.5 shows the number of widows in each five-year age group together with the proportion of these women who have no surviving children, one or more, three or more, or six or more surviving children, and the average number of surviving children.

Even for the 20-24 age group, nearly 60 per cent of widows have one or more surviving children, and the percentages rise rapidly to over 90 per cent for 40-44 year old women. Over half of 45-49 year old widows have three or more surviving children.

Table 4.5

Percentage of widows by number of surviving children by age of widow, 2014 Census

Age	Widows	Percentage with surviving children				MCS
		None	1+	3+	6+	
15-19	3,370	79.1	20.9	1.9	-	0.28
20-24	7,911	40.4	59.6	4.9	0.4	0.86
25-29	17,522	24.3	75.7	12.9	0.7	1.31
30-34	34,393	16.4	83.6	24.6	1.4	1.76
35-39	58,802	11.7	88.3	37.5	3.6	2.23
40-44	97,098	9.6	90.4	47.6	6.8	2.64
45-49	142,017	8.1	91.9	55.0	10.1	2.96
50-54	200,644	8.4	91.6	60.5	13.7	3.22
55-59	236,877	8.6	91.4	65.0	17.9	3.50
60-64	262,531	10.5	89.5	66.9	21.9	3.67
65-69	238,012	11.1	88.9	69.4	26.4	3.91
70-74	210,388	13.9	86.1	67.8	27.6	3.88
75-79	195,019	15.5	84.5	66.9	27.8	3.85
80-84	139,050	18.8	81.2	62.8	25.1	3.60
85-89	74,142	21.1	78.9	59.7	22.6	3.40
90+	36,332	24.9	75.1	53.9	18.5	3.04
Total	**1,954,108**	**12.5**	**87.5**	**61.3**	**19.7**	**3.43**

Source: Special tabulation of the 2014 Census.

Note: The '1+', '3+' and '6+' columns show the percentage of widows with one or more, three or more or six or more surviving children respectively. MCS = Mean number of surviving children per woman.

Chapter 5. Marital Sorting

5.1 Introduction

Marital sorting is a fundamental aspect of nuptiality studied in economics and sociology in connection with income inequality (Becker, 1973; Becker, 1974), intergenerational mobility (Ermisch et al, 2006), and gender inequality (Schwartz (2013). It refers to a tendency for people to marry people with characteristics similar to their own. Population census information provides data on marital sorting to the extent that it allows identification of married couples in households (Esteve and Cortina, 2006; Hakobayn, 2015; Kalmijn, 1994; Liu and Lu, 2006; Schwartz and Mare, 2005).

Marital sorting has not been widely studied in demographic literature or in population census reports, despite the inclusion of a question on the relationship to the head of household in nearly every population census. Part of the explanation may be the technical challenges that must be overcome.

This chapter presents results on marital sorting in Myanmar based on the 2014 Census results. Institutional households are excluded from consideration because most characteristics of interest, in particular the relationship to the head of household in order to identify married couples, were collected only for persons in conventional households.

5.2 Head couples

Every conventional household includes one person identified as head of household. Households that include a person identified as spouse of the head of household therefore contain a married couple, one of whom - usually, but not always, the husband - is regarded as the head of household. These couples may be referred to as “head couples”.

It should be noted, however, that households enumerated in the 2014 Census may not have included a head couple. The head of household may have been widowed, for example, or the spouse of a married head may have been enumerated in a different household. Furthermore, a household may have included one or more married couples that are not head couples, but it is not possible to identify these couples from the information on relationship collected in the Census. It may be known, for example, that a household included a married man and a married woman who might have been a married couple, but there is no way of knowing (from their relationship to the head) whether the two were in fact husband and wife.

The total number of married couples may be estimated, however, as the total number of married females. The 2014 Census recorded 10,765,048 married females and 7,669,642 head couples in conventional households. Head couples therefore constitute approximately 70 per cent of all married couples.

The number of married females gives a useful but imperfect estimate of married couples. If the information on age, sex and marital status collected in the Census is perfectly correct, and if no men have more than one wife, and no women more than one husband, the estimate is exact. In practice, neither supposition is strictly correct. Reporting errors do occur; some men have more than one wife, and some women may have more than one husband. Moreover, there may be a number of people legally married to each other but no longer cohabiting.

The 2014 Census recorded 10,017,537 married males, 747,511 fewer than the number of married females. It is not known what part of this difference reflects reporting errors, what part reflects multiple spouses, and what part reflects international migration. If the whole difference were due to multiple spouses, the frequency of multiple spouses would be rather high. If the difference reflects 747,511 men with two wives, for example, 7.5 per cent of all married men would have two wives. This is considered to be unlikely, and that the difference is mainly due to an excess of married male emigration (Department of Population, 2016b).

For the purposes of this chapter it is assumed that the difference is due to reporting errors, and further that women report marital status more accurately than men. The number of married women is therefore accepted as the estimate of the total number of married couples with either or both spouses enumerated in a conventional household. This total includes couples with one spouse living in an institutional household or outside Myanmar.

Head couples may be cross-classified by any characteristic of husband and any characteristic of wife provided by the Census. This chapter provides results on marital sorting for five characteristics: age, literacy, educational attainment, Township of birth, and economic activity status. The cross-classification for economic activity does not strictly refer to marital sorting, because economic activity status may change after marriage, but is of interest in its own right.

5.3 Age difference between spouses

Marital sorting by age may be investigated by cross-classifying couples by age of husband and of wife, but a simpler approach is to look at the frequency distribution of age of husband minus age of wife.

Table 5.1 shows the mean difference, and partial frequency distribution of the difference, between age of husband and age of wife for head couples. The mean difference at the national level, shown in the first column is +2.8 years, but the partial distributions show how great the variability is in the age difference. The mean age difference is close to +3 years, but couples for which age of husband exceeds age of wife by this number are only 8.8 per cent of all couples - over 90 per cent of all couples have an age difference of greater than or less than three years. Husbands older than their wives are most common, but wives the same age as, or older than, their husbands occur in nearly one third of all couples. Note that the column headed '>0' represents those couples where the wife is older than the husband.

Figure 5.1 shows the substantial variability of mean age at marriage between the States and Regions. Chin is an outlier, with the highest difference, 4.6 years. There is a curious discontinuity between the three States/Regions with the lowest age difference, Magway, Sagaing and Mandalay, with a difference of just over two years, and the remaining States/Regions, which all have differences greater than 2.6 years.

Table 5.1

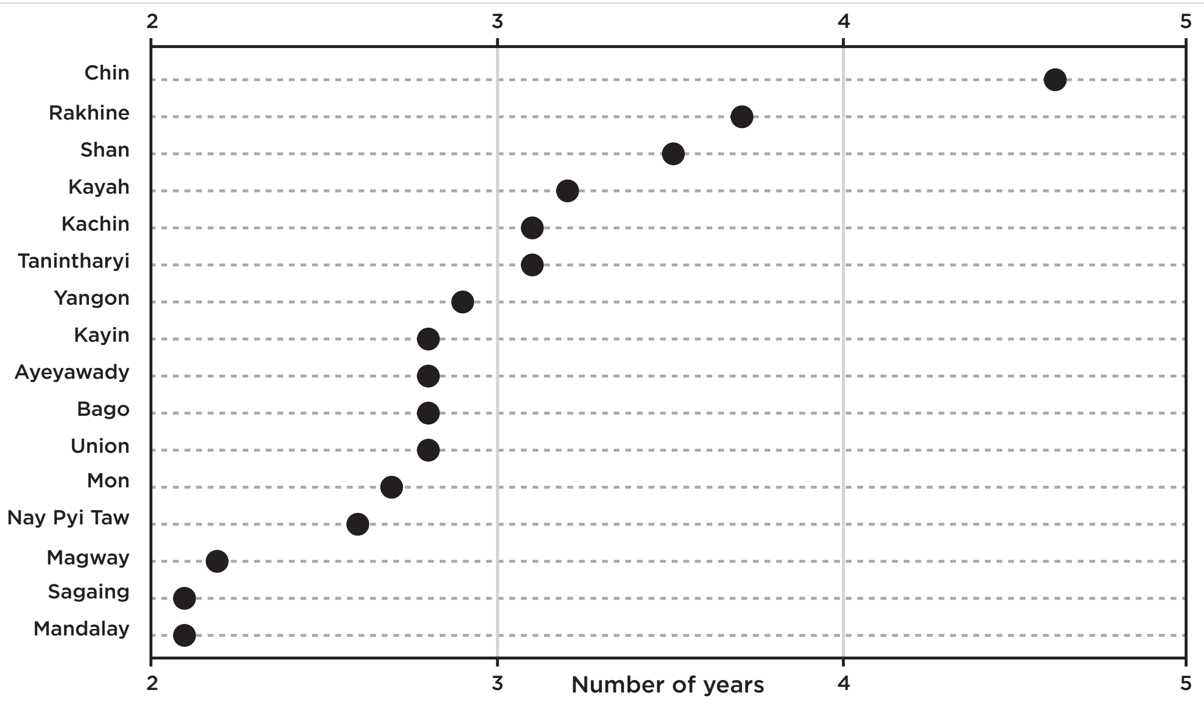
Mean and partial distribution of age of husband minus age of wife for head couples, 2014 Census

State/Region	Mean	Percentage distribution of head couples by age difference (in years)						
		<0	0	1	2	3	4	>4
Union	2.8	20.9	10.7	11.0	11.0	8.8	7.2	30.4
Kachin	3.1	21.6	9.6	9.7	9.7	7.9	6.8	34.7
Kayah	3.2	20.2	8.6	9.5	10.0	8.4	7.4	35.9
Kayin	2.8	19.9	10.5	11.6	11.6	8.8	7.0	30.7
Chin	4.6	14.6	7.1	9.0	9.8	8.4	7.4	43.7
Sagaing	2.1	24.3	12.7	11.8	11.0	8.5	6.6	25.2
Tanintharyi	3.1	19.0	9.3	11.7	11.4	9.1	7.3	32.1
Bago	2.8	19.9	10.7	11.0	11.3	9.3	7.7	30.2
Magway	2.2	23.6	12.5	12.1	11.2	8.9	6.8	24.9
Mandalay	2.1	24.9	12.3	11.4	10.8	8.4	6.5	25.8
Mon	2.7	18.2	11.6	12.5	12.6	9.6	7.5	28.0
Rakhine	3.7	8.1	8.9	13.4	14.6	1.7	9.4	34.0
Yangon	2.9	21.3	10.2	10.1	10.2	8.4	7.2	32.5
Shan	3.5	18.2	8.8	9.9	10.8	8.2	6.7	37.4
Ayeyawady	2.8	21.5	9.9	10.4	10.7	9.0	7.5	31.1
Nay Pyi Taw	2.6	21.5	11.2	11.1	11.0	8.8	7.1	29.2

Source: Special tabulation of the 2014 Census.

Figure 5.1

Mean age difference at marriage between head couple spouses, 2014 Census



Source: Table 5.1

5.4 Literacy

Table 5.2 shows head couples by literacy of husband and literacy of wife. Literacy of husband and wife is the same for nearly 90 per cent of all couples. Couples in which only the husband is literate are four times more common than couples in which only the wife is literate, 9.0 per cent compared with 2.2 per cent.

Some excess of male-only-literate over female-only-literate head couples is expected, given that the number of illiterate wives (1,151,067) exceeds the number of illiterate husbands (623,611). Defining a suitable measure of the strength of marital sorting is a non-trivial problem, as demonstrated by the meticulous analysis of Liu and Lu (2006), which applies only to dichotomous variables.

Table 5.2

Head couples by literacy of husband and literacy of wife, 2014 Census

	Wife		
Husband	Literate	Illiterate	**Total**
Literate	6,352,349	693,679	7,046,031
Illiterate	166,223	457,388	623,611
Total	6,518,572	1,151,067	7,669,642
			Percentage
Both literate or both illiterate			88.8
Both literate			82.8
Both illiterate			6.0
One literate, one illiterate			11.2
Husband literate, wife illiterate			9.0
Wife literate, husband illiterate			2.2
Percentage literate among women			85.0
Percentage literate among men			91.9

Source: Special tabulation of the 2014 Myanmar Population and Housing Census.

5.5 Educational attainment

Table 5.3 cross-classifies head couples by educational attainment of husband and wife. Just over half of head couples consist of spouses with the same level of education. The base of these proportions excludes couples for which husband or wife were reported as having "other" education. Fewer than 3 per cent of all head couples were so reported.

Head couples for which the husband's education is higher than the wife's education are almost twice as common (27.6 per cent) as couples for which the reverse is true (15.2 per cent). Head couples for which the education of the spouses is the same as, or only one level different from, the spouse comprise nearly 90 per cent of all couples.

Table 5.3

Head couples by completed level of educational attainment of husband and completed level of educational attainment of wife (numbers in thousands), 2014 Census

Husband's level of education	Wife's level of education							Thousands
	None	Primary	Middle	Higher	Graduate/ diploma	Post graduate	Other	Total (All wives)
None	762	294	39	7	1	0	2	1,105
Primary	494	2571	376	98	27	0	21	3,587
Middle	114	852	461	152	63	1	8	1,651
Higher	19	221	201	189	93	3	2	728
Graduate/diploma	3	44	64	90	200	8	1	410
Post graduate	0	1	1	3	9	4	0	18
Other	33	62	8	2	1	0	65	171
Total (All husbands)	1,425	4,045	1,150	541	394	16	99	7,670

	Number	Percentage*
Husband and wife same educational attainment	4,188	54.6
Husband has higher educational attainment	2,114	27.6
Wife has higher educational attainment	1,164	15.2
All "other" cells	204	2.7
Same or one level difference	6,757	88.1
Two or more levels difference	709	9.2

Source: Special tabulation 2014 Census.

Note: The base of these proportions (*) excludes couples for which husband or wife were reported as having 'other' education.

5.6 Township of birth

Table 5.4 presents the cross-classification of head couples by whether the Township of birth of the spouses is the same or different at the Union level and for the 15 States and Regions. For the Union, one quarter of all couples were born in a different Township, but there is considerable variability among the States and Regions. Figure 5.2 plots these percentages and shows that Yangon and Kachin are outliers on the high side, with 51.5 per cent and 43.0 per cent of couples with spouses born in different Townships. On the low side, Chin is also an outlier, with only 7.7 per cent of couples born in different Townships.

Table 5.4

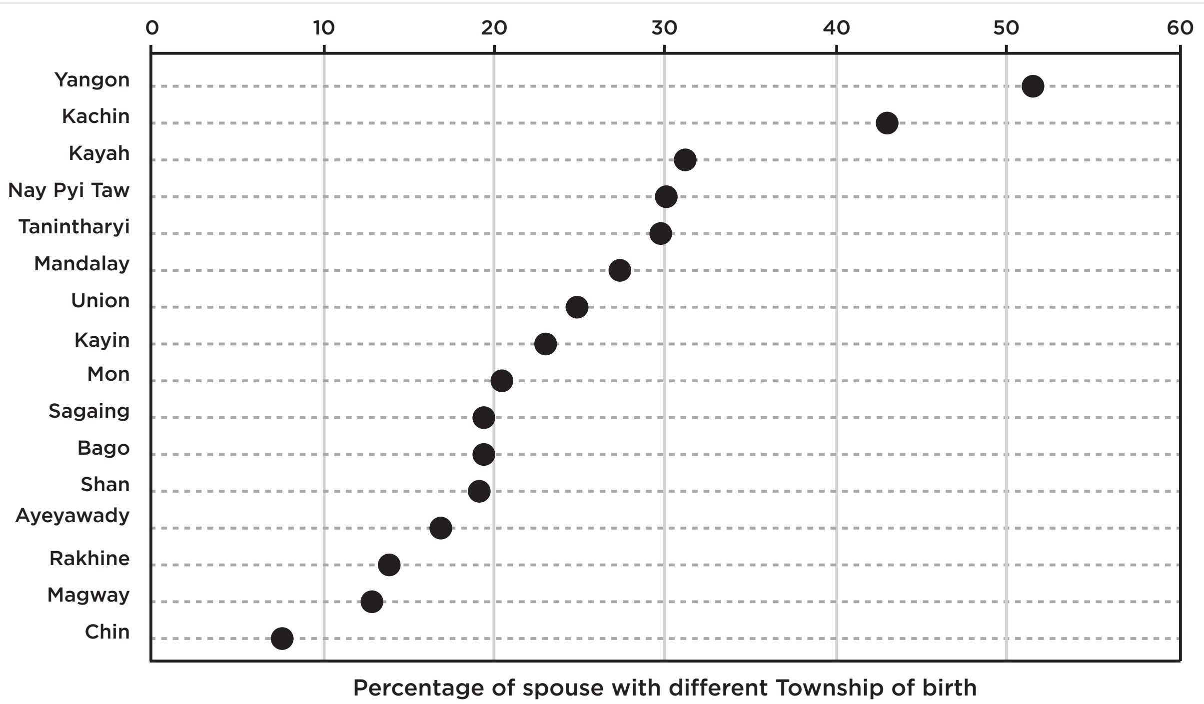
Head couples by whether husband and wife were born in same Township, 2014 Census

State/Region	Total head couples	Same Township of birth	Different Township of birth	Per cent different Township
Total	7,669,642	5,757,933	1,911,709	24.9
Kachin	183,316	104,415	78,901	43.0
Kayah	40,809	28,069	12,740	31.2
Kayin	217,175	167,287	49,888	23.0
Chin	65,378	60,355	5,023	7.7
Sagaing	754,790	608,019	146,771	19.4
Tanintharyi	204,959	144,006	60,953	29.7
Bago	817,963	659,453	158,510	19.4
Magway	623,281	543,136	80,145	12.9
Mandalay	906,700	657,904	248,796	27.4
Mon	280,907	223,665	57,242	20.4
Rakhine	333,664	287,732	45,932	13.8
Yangon	1,086,965	526,957	560,008	51.5
Shan	863,126	697,882	165,244	19.1
Ayeyawady	1,102,837	917,864	184,973	16.8
Nay Pyi Taw	187,772	131,189	56,583	30.1

Source: Special tabulation, 2014 Census.

Figure 5.2

Percentage of head couples where husband and wife were born in different Townships, 2014 Census



Source: Table 5.4

5.7 Economic activity status

Table 5.5 shows head couples cross-classified by activity status of husband and activity status of wife. Because activity status for both men and women may change after marriage, this is not strictly marital sorting, but the technique used to generate the table is the same and the information is relevant to the fertility differentials presented in the following chapter.

Participation in economic activity is the biggest single difference between husbands and wives: less than 1 per cent of head couple husbands were reported as inactive compared with 58 per cent of wives. Indeed, the diagonal line in Table 5.1 shows that only in a quarter of head couples (1.7 million of the total 6.7 million) did the husband and wife report having the same economic activity status.

The most common economic activity categories for husbands were own account worker (52.7 per cent), employed by a private company or organization (29.2 per cent), employer (8.2 per cent), and government employee (5.4 per cent). These four categories accounted for over 95 per cent of all head couple husbands.

For economically active wives, own account worker was also the most common category (16.3 per cent though proportionately far fewer than the percentage for husbands), followed by contributing family worker (13.7 per cent), employee of private company or organization (8.5 per cent), government employee (2.1 per cent), and employer (1.2 per cent). Although these five categories accounted for only 42 per cent of all head couple wives they comprised over 99 per cent of economically active head couple wives.

Head couples in which the husband was an own-account worker and the wife economically inactive was the most common combination. There were just under 2 million such couples, representing 29 per cent of all head couples. The second and third most common combinations were where the wife was economically inactive and the husband was employed by a private company or organization (1.2 million couples, 18 per cent) and where husband and wife were both own account workers (892 thousand couples, 13 per cent). These three combinations accounted for 60 per cent of all head couples.

The next most common combinations were own account worker husband/contributing family worker wife (621 thousand couples), husband and wife both employees of a private company or organization (508 thousand couples), husband employer/wife economically inactive (347 thousand couples), and husband government employee/wife economically inactive (241 thousand couples). These four combinations made up an additional 25 per cent of all head couples.

Table 5.5

Head couples by economic activity of husband and economic activity of wife (numbers in thousands), 2014 Census

Thousands

Husband's activity status	Wife's economic activity status: Employee – Govt	Employee – Private	Employer	Own Account Worker	Family Worker	Sought Work	Did Not Seek work	Inactive	Total (All wives)	Percentage of husbands
Employee										
Govt	63	8	3	29	16	1	0	241	363	5.4
Private	22	508	5	123	89	4	1	1,219	1,929	29.2
Employer	9	7	63	31	92	1	0	347	550	8.2
Own Account Worker	43	40	5	892	621	5	1	1,946	3,553	52.7
Family Worker	4	3	1	9	106	0	0	84	204	3.0
Sought Work	2	2	0	5	2	8	0	42	62	0.9
Did Not Seek work	0	1	0	2	0	0	1	5	9	0.1
Inactive	2	4	1	8	1	0	0	17	32	0.5
Total (All husbands)	144	572	78	1,100	927	20	3	3,900	6,745	100
Percentage of wives	2.1	8.5	1.2	16.3	13.7	0.3	0.1	57.8	100	

Chapter 6. Fertility Differentials

6.1 Introduction

This chapter presents fertility and marital fertility differentials by literacy, education, economic activity status, and occupation. Section 6.2 presents fertility differentials. Section 6.3 presents marital fertility differentials and compares them with overall fertility differentials.

Because the number of economically active women is much smaller than the number of economically active men, numbers of women in some economic activity categories may be too small to provide useful estimates of fertility. Table 5.5 of the preceding chapter shows that nearly 60 per cent of women who are wives in head couples were reported in the 2014 Census as economically inactive, compared with only 0.5 per cent of males.

Partly for this reason, and partly because women are under-represented in some occupational groups, numbers of women in professional occupational groups are very small. There were only 3,468 women aged 15-49 years in the armed forces, for example, and they only had 240 births during the 12 months prior to the Census.

In this context it may be more useful to look at fertility of women by the occupation of their husbands. This is possible only for women who are wives in head couples as defined in section 5.2 of Chapter 5. Section 6.4 presents estimates of fertility for head couples by characteristics of the husband, while section 6.5 presents estimates of fertility for head couples by characteristics of the wife. Because armed forces personnel tend to live in institutional households, for which fertility information was not collected by the Census, the occupation 'armed forces' is omitted in the tables.

Head couples comprise about 70 per cent of all married couples, a substantial majority, but it is of interest to know how representative head couples are of all couples. The 2014 Census information did not permit the identification of married couples within a household unless they were head couples (see section 5.2), but fertility estimates for head couples by characteristics of wife may be compared with those of wives in non-head couples. Section 6.5 makes this comparison.

The estimates of fertility and marital fertility in sections 6.2 and 6.3 are adjusted for errors in the reporting of month and year of most recent live birth by the method described in Appendix A. The estimates of marital fertility for head and non-head couple wives are not adjusted because such adjustment is impossible, the logic of the adjustment procedure does not apply to subgroups of women defined by marital status. The marital fertility estimates presented in sections 6.4 and 6.5 are therefore not comparable to the estimates in sections 6.2 and 6.3.

6.2 Fertility differentials

Table 6.1 presents age-specific and total fertility rates by characteristics of woman. Total fertility is plotted in Figure 6.1. Fertility differentials show associations between fertility and other variables, but they do not establish a causal relationship. (For an acute discussion of statistical association and causality, see Mosteller and Tukey, pages 260-261).

Total fertility for the various subgroups of women ranges from a high of 4.0 children per woman for illiterate women to a low of 1.0 child per woman for professional women. Education shows the widest range of fertility levels, from a high of 3.9 children per woman for women with no education to a low of 1.2 children per woman for women with more than a high school education. The education differentials are notable for uniformity of relationship. Without exception, the higher the education, the lower the fertility.

Table 6.1

Age-specific and total fertility rates by selected characteristics of women, 2014 Census

	Age-specific fertility rates (adjusted)							
Characteristic	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**TF**
Literacy of women								
Literate	0.0290	0.1002	0.1213	0.1058	0.0710	0.0303	0.0063	2.32
Illiterate	0.0923	0.1945	0.1866	0.1559	0.1122	0.0540	0.0150	4.05
Education level of women								
None	0.0907	0.1902	0.1823	0.1513	0.1090	0.0514	0.0138	3.94
Primary School	0.0491	0.1291	0.1323	0.1094	0.0755	0.0344	0.0070	2.68
Middle/Vocational School	0.0279	0.1028	0.1194	0.0994	0.0614	0.0244	0.0050	2.20
High School	0.0114	0.0820	0.1100	0.0941	0.0566	0.0179	0.0033	1.88
Above High School	0.0038	0.0277	0.0675	0.0744	0.0465	0.0140	0.0022	1.18
Activity status of women								
Employee - government	0.0107	0.0246	0.0587	0.0702	0.0455	0.0132	0.0023	1.13
Employee - private	0.0239	0.0656	0.0920	0.0955	0.0739	0.0369	0.0104	1.99
Employer	0.0362	0.0834	0.1008	0.0825	0.0476	0.0195	0.0052	1.88
Own account worker	0.0446	0.0981	0.1044	0.0858	0.0568	0.0249	0.0067	2.11
Contributing family worker	0.0362	0.0961	0.1114	0.0971	0.0679	0.0322	0.0084	2.25
Sought work	0.0105	0.0257	0.0498	0.0545	0.0445	0.0237	0.0063	1.08
Did not seek work	0.0156	0.0504	0.0715	0.0670	0.0594	0.0168	0.0042	1.42
Economically inactive	0.0336	0.1459	0.1590	0.1293	0.0858	0.0364	0.0072	2.99
Occupation of women								
Managers	0.0177	0.0173	0.0474	0.0691	0.0441	0.0137	0.0023	1.06
Professionals	0.0065	0.0185	0.0491	0.0652	0.0455	0.0132	0.0020	1.00
Technical/associate professionals	0.0119	0.0278	0.0670	0.0855	0.0527	0.0159	0.0027	1.32
Clerical support workers	0.0104	0.0206	0.0544	0.0689	0.0476	0.0151	0.0027	1.10
Services/sales workers	0.0209	0.0649	0.0997	0.0935	0.0611	0.0237	0.0062	1.85
Skilled agricultural workers	0.0459	0.1123	0.1201	0.0997	0.0684	0.0326	0.0089	2.44
Craft/related trades	0.0153	0.0489	0.0782	0.0817	0.0581	0.0273	0.0075	1.59
Machine operators/assemblers	0.0140	0.0411	0.0704	0.0735	0.0536	0.0184	0.0101	1.41
Elementary occupations	0.0334	0.1026	0.1235	0.1095	0.0823	0.0402	0.0108	2.51

Source: 2014 Census, special tabulations.

Note: TF = Total fertility rate.

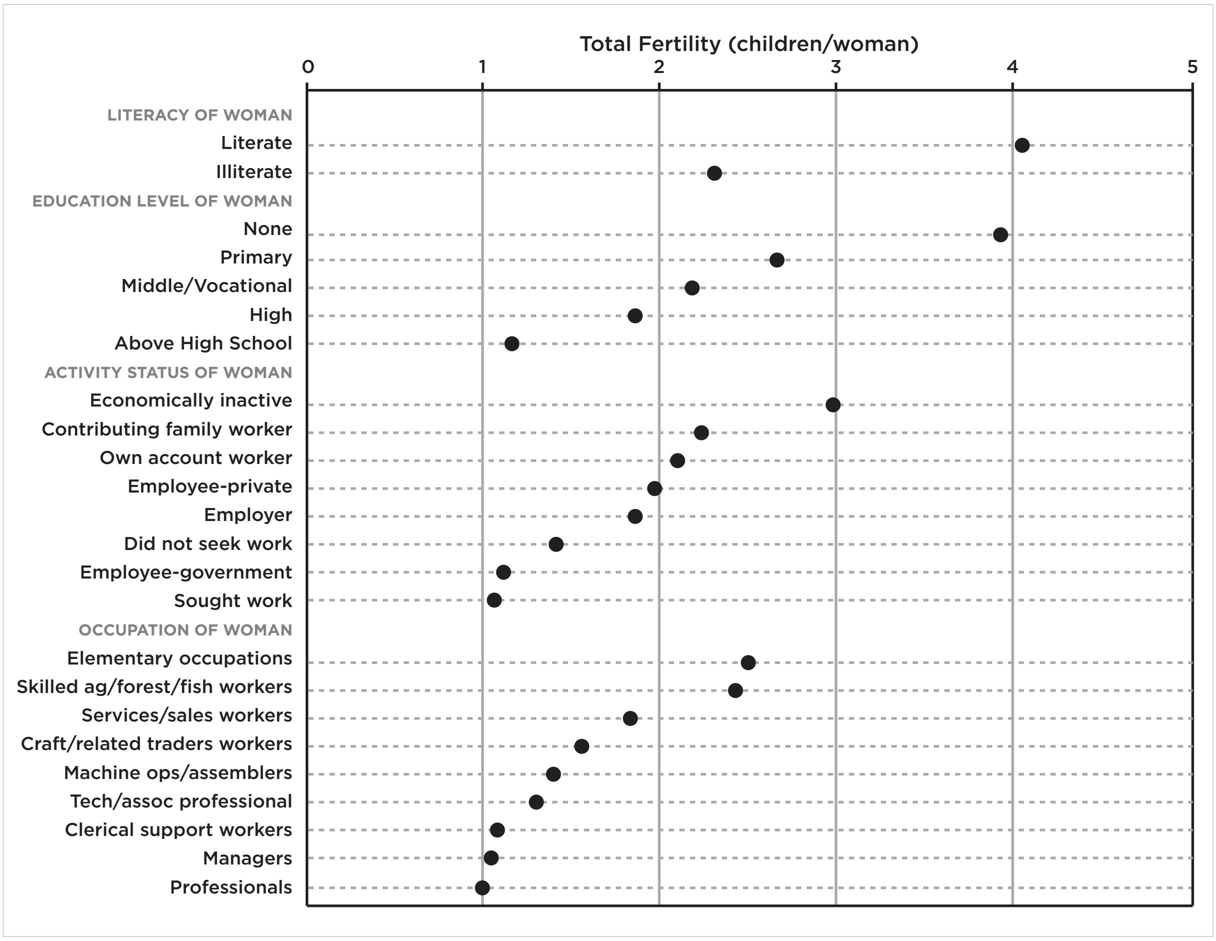
The largest difference in reported fertility was between women with no education (3.9 children per woman) and women with primary education (2.7 children per woman). The second largest difference was between women with high school education (1.9 children per woman) and women with more than high school education (1.2 children per woman).

Figure 6.1 shows that fertility of illiterate women was nearly the same as fertility of women with no education, and that fertility of literate women lay between the fertility of women with primary education and middle school or vocational education.

The variability of fertility over activity status was substantially lower than the variability for education. Economically inactive women had the highest fertility (3.0 children per woman), but this point is an outlier. Contributing family workers exhibited the next highest level of fertility, own account workers the third highest, and employers the fourth highest. Government employees and women who sought work had the lowest fertility.

Figure 6.1

Total fertility rates by selected characteristics of women, 2014 Census



Source: Table 6.1

The variability of fertility by occupation is lower still. Women in elementary occupations and skilled agricultural, forestry and fishery workers had the highest fertility, about 2.5 children per woman. Clerical support workers, managers and professionals had the lowest fertility, barely over one child per woman. Women in occupations with intermediate fertility - services and sales workers, craft and related trades workers, machine operators and assemblers, and technical and associate professionals - all reported fertility below replacement level.

6.3 Marital fertility differentials

Table 6.2 presents age-specific marital fertility rates and total marital fertility rates for all women. Figure 6.2 plots the total marital fertility rates in Table 6.2 together with the total fertility rates presented in Table 6.1.

Interpretation of the total marital fertility rates must take account of their definition as five times the sum of the age-specific marital fertility rates for women over age 15, and their interpretation as the completed fertility of a birth cohort of women all of whom marry at exact age 15 years. Because many women marry at older ages, the measure exaggerates the level of marital fertility. A measure based on duration-specific fertility rates would give a more accurate indication of level, but the 2014 Census did not include a question on age at first marriage, making the calculation of duration-of-marriage-specific rates impossible.

Table 6.2

Age-specific and total marital fertility rates by selected characteristics of women, 2014 Census

	Age-specific marital fertility rates (adjusted)							
Characteristic	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**TMF**
Literacy of women								
Literate	0.2449	0.2301	0.1860	0.1415	0.0918	0.0393	0.0084	3.49
Illiterate	0.3496	0.3033	0.2378	0.1886	0.1338	0.0663	0.0193	4.74
Education level of women								
None	0.3525	0.2986	0.2334	0.1835	0.1304	0.0632	0.0177	4.63
Primary School	0.2448	0.2271	0.1809	0.1379	0.0937	0.0430	0.0091	3.46
Middle/Vocational School	0.2331	0.2209	0.1764	0.1301	0.0787	0.0316	0.0067	3.22
High School	0.2130	0.2142	0.1786	0.1302	0.0759	0.0245	0.0047	3.14
Above High School	0.1193	0.1665	0.1552	0.1263	0.0739	0.0224	0.0036	2.74
Activity status of women								
Employee - government	0.1241	0.1465	0.1569	0.1284	0.0774	0.0225	0.0041	2.68
Employee - private	0.2011	0.2159	0.1917	0.1587	0.1148	0.0585	0.0174	3.78
Employer	0.2230	0.1976	0.1683	0.1225	0.0716	0.0309	0.0091	3.00
Own account worker	0.2495	0.2175	0.1679	0.1241	0.0815	0.0369	0.0105	3.19
Contributing family worker	0.2403	0.2241	0.1792	0.1345	0.0878	0.0399	0.0102	3.38
Sought work	0.1410	0.1608	0.1598	0.1308	0.0929	0.0465	0.0120	3.01
Did not seek work	0.1957	0.2064	0.1712	0.1393	0.1164	0.0328	0.0080	3.37
Economically inactive	0.2772	0.2443	0.1926	0.1475	0.0969	0.0418	0.0086	3.66

Table 6.2 (continued)

Age-specific and total fertility rates by selected characteristics of women, 2014 Census

	Age-specific marital fertility rates (adjusted)							
Characteristic	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**TMF**
Occupation of women								
Managers	0.1829	0.1240	0.1337	0.1268	0.0737	0.0228	0.0040	2.42
Professionals	0.0948	0.1411	0.1561	0.1345	0.0864	0.0244	0.0038	2.73
Technical/associate professionals	0.1356	0.1667	0.1791	0.1481	0.0820	0.0250	0.0044	3.03
Clerical support workers	0.1212	0.1327	0.1591	0.1342	0.0823	0.0260	0.0046	2.69
Services/sales workers	0.2227	0.2256	0.1961	0.1461	0.0911	0.0360	0.0099	3.52
Skilled agricultural workers	0.2632	0.2369	0.1830	0.1366	0.0913	0.0437	0.0124	3.52
Craft/related trades	0.1555	0.1819	0.1776	0.1483	0.0980	0.0462	0.0131	3.33
Machine operators/assemblers	0.1169	0.1441	0.1589	0.1342	0.0910	0.0317	0.0172	2.88
Elementary occupations	0.2324	0.2427	0.2009	0.1575	0.1166	0.0592	0.0170	3.97

Source: Special tabulations, 2014 Census.

Note: Age-specific marital fertility rates were calculated by dividing age-specific fertility rates in Table 6.1 by the proportion of currently married women for age group. TMF = Total Marital Fertility.

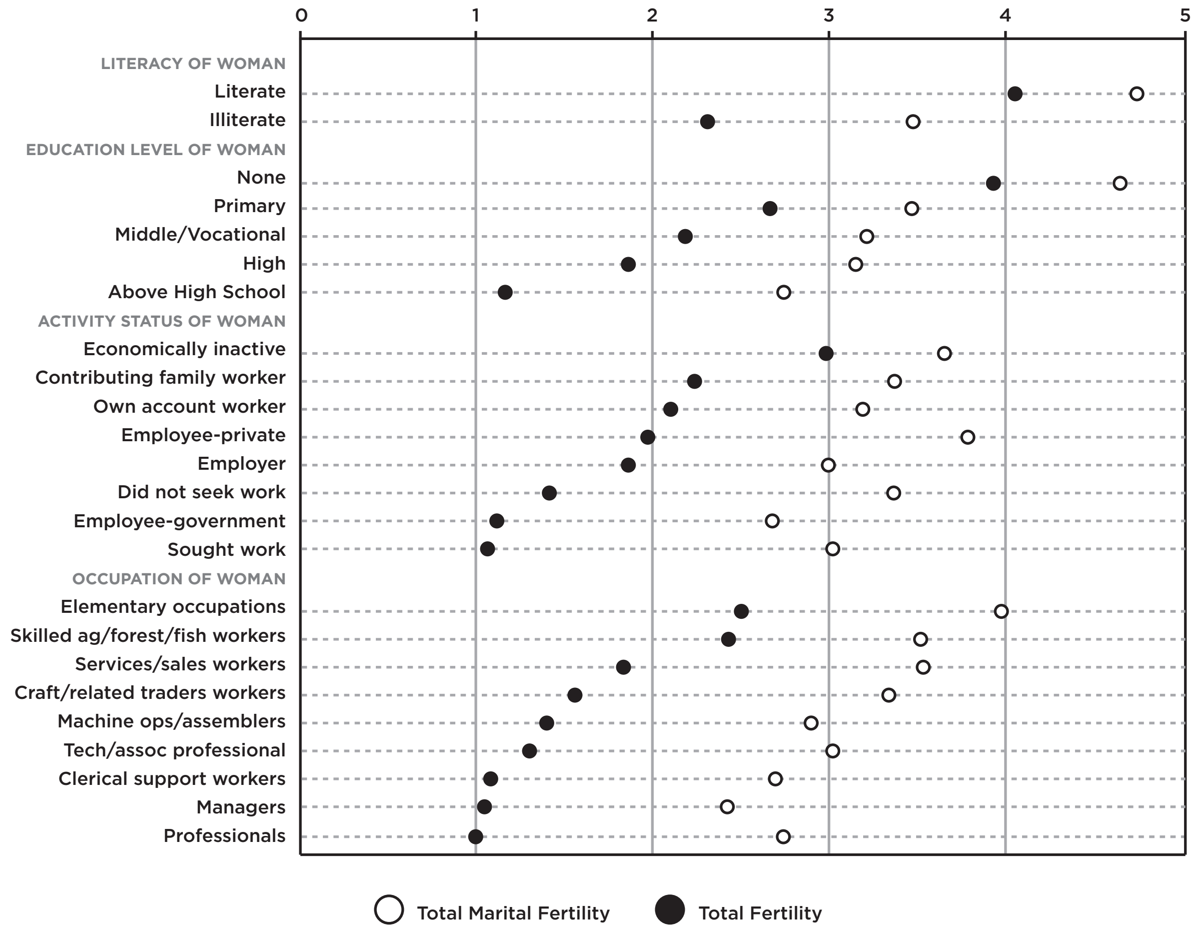
Total marital fertility is expected to be higher than total fertility because some women never marry and because, as noted in section 2.2, the fertility of never married women is expected to be negligible. Figure 6.2 shows that total marital fertility is higher than total fertility for all categories of the four variables shown. It shows also that the pattern of differences for marital fertility is generally similar to the pattern for total fertility. There are however differences in detail.

The difference between total marital fertility for literate and illiterate women, for example, is smaller than the difference in total fertility. This may reflect a higher proportion of never married for literate women. A similar pattern is observed for education. The difference between total marital fertility and total fertility increases steadily from the least to the most educated women.

There is no intrinsic hierarchical ordering of the activity status and occupation categories. Categories in Figure 6.2 are ordered by the level of total fertility. For activity status, total marital fertility and total fertility decline from the economically inactive women to those who sought work, but total marital fertility for women who were reported in the Census as a private employee, or who did not seek work or who sought work are outliers.

Figure 6.2

Total marital fertility and total fertility rates by selected characteristics of women, 2014 Census



Source: Table 6.2 and Table 6.1

Note: See notes to Table 6.2

6.4 Fertility of head couple wives by characteristics of husband

Table 6.3 presents age-specific and total marital fertility for head couple wives by characteristics of husband. Total marital fertility is plotted in Figure 6.3. Values range from a high of 5.4 children per woman, for women with illiterate husbands, to a low of 3.6 children per woman, this latter value is shared by women whose husbands have above high school education, whose husbands are government employees, women whose husbands are mangers, and women whose husbands are clerical support workers.

Table 6.3

Age-specific and total marital fertility rates of head couple wives by selected characteristics of husband, 2014 Census

	Age-specific marital fertility rates (unadjusted)							
Characteristic	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**TMF**
Literacy of husband								
Literate	0.2208	0.2203	0.1760	0.1340	0.0882	0.0384	0.0080	4.43
Illiterate	0.2845	0.2566	0.1998	0.1579	0.1102	0.0565	0.0182	5.42
Education level of husband								
None	0.2767	0.2505	0.1945	0.1522	0.1051	0.0516	0.0142	5.22
Primary School	0.2355	0.2295	0.1807	0.1378	0.0954	0.0440	0.0093	4.66
Middle/Vocational School	0.2083	0.2178	0.1727	0.1284	0.0803	0.0337	0.0069	4.24
High School	0.1839	0.2028	0.1684	0.1253	0.0743	0.0260	0.0046	3.93
Above High School	0.1558	0.1766	0.1617	0.1325	0.0727	0.0208	0.0034	3.62
Activity status of husband								
Employee - government	0.1731	0.1897	0.1536	0.1180	0.0663	0.0231	0.0048	3.64
Employee - private	0.2146	0.2184	0.1781	0.1407	0.0994	0.0470	0.0104	4.54
Employer	0.2309	0.2226	0.1708	0.1254	0.0771	0.0307	0.0061	4.32
Own account worker	0.2523	0.2309	0.1796	0.1342	0.0880	0.0393	0.0089	4.67
Contributing family worker	0.2631	0.2579	0.2022	0.1545	0.0997	0.0457	0.0115	5.17
Sought work	0.2073	0.2236	0.1785	0.1471	0.0985	0.0459	0.0101	4.56
Did not seek work	0.2647	0.2315	0.2050	0.1352	0.0970	0.0339	0.0064	4.87
Economically inactive	0.0935	0.1921	0.1882	0.1495	0.0883	0.0373	0.0103	3.80
Occupation of husband								
Managers	0.1290	0.2081	0.1621	0.1240	0.0675	0.0208	0.0035	3.58
Professionals	0.2070	0.2134	0.1798	0.1472	0.0887	0.0249	0.0039	4.32
Technical/associate professionals	0.1927	0.2012	0.1689	0.1278	0.0689	0.0240	0.0044	3.94
Clerical support workers	0.1627	0.1794	0.1565	0.1211	0.0721	0.0252	0.0051	3.61
Services/sales workers	0.1836	0.1973	0.1623	0.1250	0.0745	0.0278	0.0060	3.88
Skilled agricultural workers	0.2600	0.2383	0.1846	0.1385	0.0926	0.0425	0.0097	4.83
Craft/related trades	0.1969	0.2096	0.1738	0.1348	0.0889	0.0389	0.0084	4.26
Machine operators/assemblers	0.1926	0.2015	0.1635	0.1213	0.0748	0.0280	0.0055	3.94
Elementary occupations	0.2270	0.2273	0.1827	0.1443	0.1054	0.0520	0.0112	4.75

Source: Table 6.2 and Table 6.1

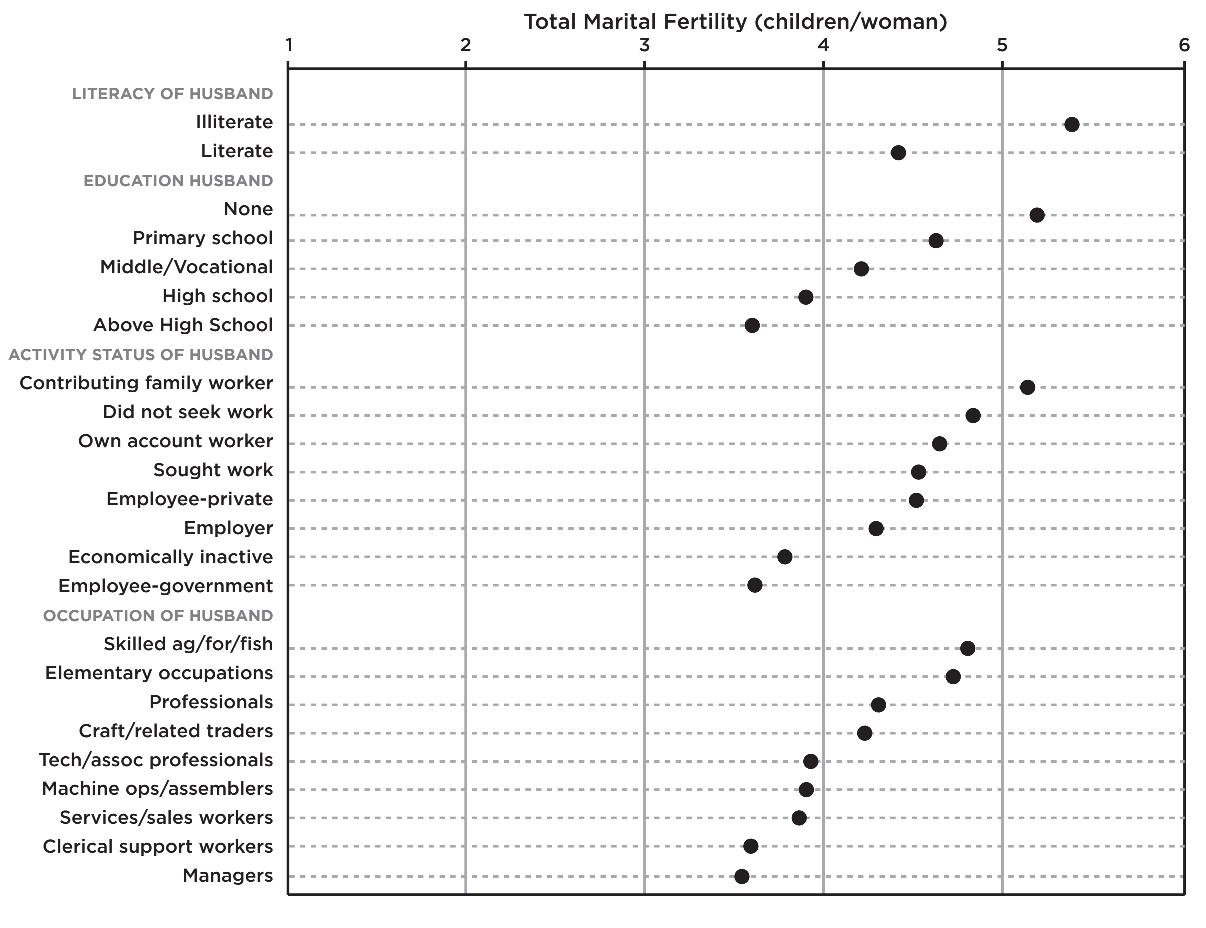
Note: See notes to Table 6.2

Figure 6.3 shows that total marital fertility of head couple wives by education of husbands drops regularly from 5.2 children per woman for women whose husbands have no education to 3.6 children per woman for women whose husbands have more than a high school education.

Differences by activity status are marginally less regular, but the range is very similar to that for educational categories: from 3.64 to 5.17 children per woman, compared with 3.62 to 5.22 children per woman.

Figure 6.3

Total marital fertility rate of head couple wives by selected characteristics of husband, 2014 Census



Source: Table 6.3

Differences by occupational category are also slightly less regular, and the highest and lowest values are slightly lower and closer together than for education, 3.58 to 4.83 children per woman compared with 3.62 to 5.22.

6.5 Fertility of head couple wives by characteristics of wife

Table 6.4 presents age-specific marital fertility rates and total marital fertility of head couple wives by characteristic of wife. Figure 6.3 plots these total marital fertility values together with total marital fertility of head couple wives by characteristic of husband from Table 6.3.

Figure 6.4 shows a striking divergence. The correlation between fertility of head couple wives in a given literacy or educational attainment category and fertility of head couple wives whose husband is in the same category is all but perfect. A high correlation is expected, given the tendency of husbands and wives to have similar literacy and education (sections 5.4 and 5.5), but the near coincidence of the values is striking nonetheless.

Table 6.4

Age-specific and total marital fertility rates of head couple wives by selected characteristics of wife, 2014 Census

	Age-specific marital fertility rates (unadjusted)							
Characteristic	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**TMF**
Literacy of wife								
Literate	0.2176	0.2186	0.1745	0.1327	0.0866	0.0375	0.0076	4.38
Illiterate	0.2872	0.2574	0.2013	0.1569	0.1111	0.0540	0.0154	5.42
Education level of wife								
None	0.2851	0.2540	0.1988	0.1540	0.1089	0.0518	0.0141	5.33
Primary School	0.2341	0.2273	0.1777	0.1349	0.0919	0.0424	0.0085	4.58
Middle/Vocational School	0.2067	0.2170	0.1713	0.1272	0.0768	0.0310	0.0062	4.18
High School	0.1656	0.2016	0.1711	0.1260	0.0734	0.0233	0.0042	3.83
Above High School	0.1020	0.1699	0.1635	0.1372	0.0776	0.0234	0.0038	3.39
Activity status of wife								
Employee - government	0.1733	0.1694	0.1676	0.1378	0.0842	0.0248	0.0041	3.81
Employee - private	0.1268	0.1409	0.1215	0.0996	0.0723	0.0371	0.0098	3.04
Employer	0.2022	0.1894	0.1500	0.1071	0.0619	0.0245	0.0070	3.71
Own account worker	0.2222	0.1974	0.1488	0.1091	0.0707	0.0323	0.0083	3.94
Contributing family worker	0.2562	0.2293	0.1751	0.1293	0.0848	0.0384	0.0096	4.61
Sought work	0.1332	0.1571	0.1480	0.1305	0.0954	0.0491	0.0092	3.61
Did not seek work	0.2960	0.2297	0.2107	0.1706	0.1499	0.0335	0.0074	5.49
Economically inactive	0.2544	0.2489	0.1987	0.1524	0.1012	0.0440	0.0089	5.04
Occupation of wife								
Managers	0.2500	0.1667	0.1677	0.1424	0.0841	0.0263	0.0045	4.21
Professionals	0.1333	0.1425	0.1628	0.1415	0.0915	0.0256	0.0038	3.51
Technical/associate professionals	0.0814	0.1418	0.1505	0.1256	0.0736	0.0226	0.0024	2.99
Clerical support workers	0.1061	0.1227	0.1348	0.1143	0.0698	0.0217	0.0042	2.87
Services/sales workers	0.1392	0.1429	0.1236	0.0934	0.0572	0.0233	0.0058	2.93
Skilled agricultural workers	0.2452	0.2212	0.1671	0.1233	0.0824	0.0391	0.0104	4.44
Craft/related trades	0.0791	0.1091	0.1056	0.0917	0.0619	0.0302	0.0073	2.42
Machine operators/assemblers	0.0569	0.0869	0.0913	0.0701	0.0485	0.0171	0.0083	1.90
Elementary occupations	0.1582	0.1664	0.1367	0.1063	0.0784	0.0396	0.0102	3.48

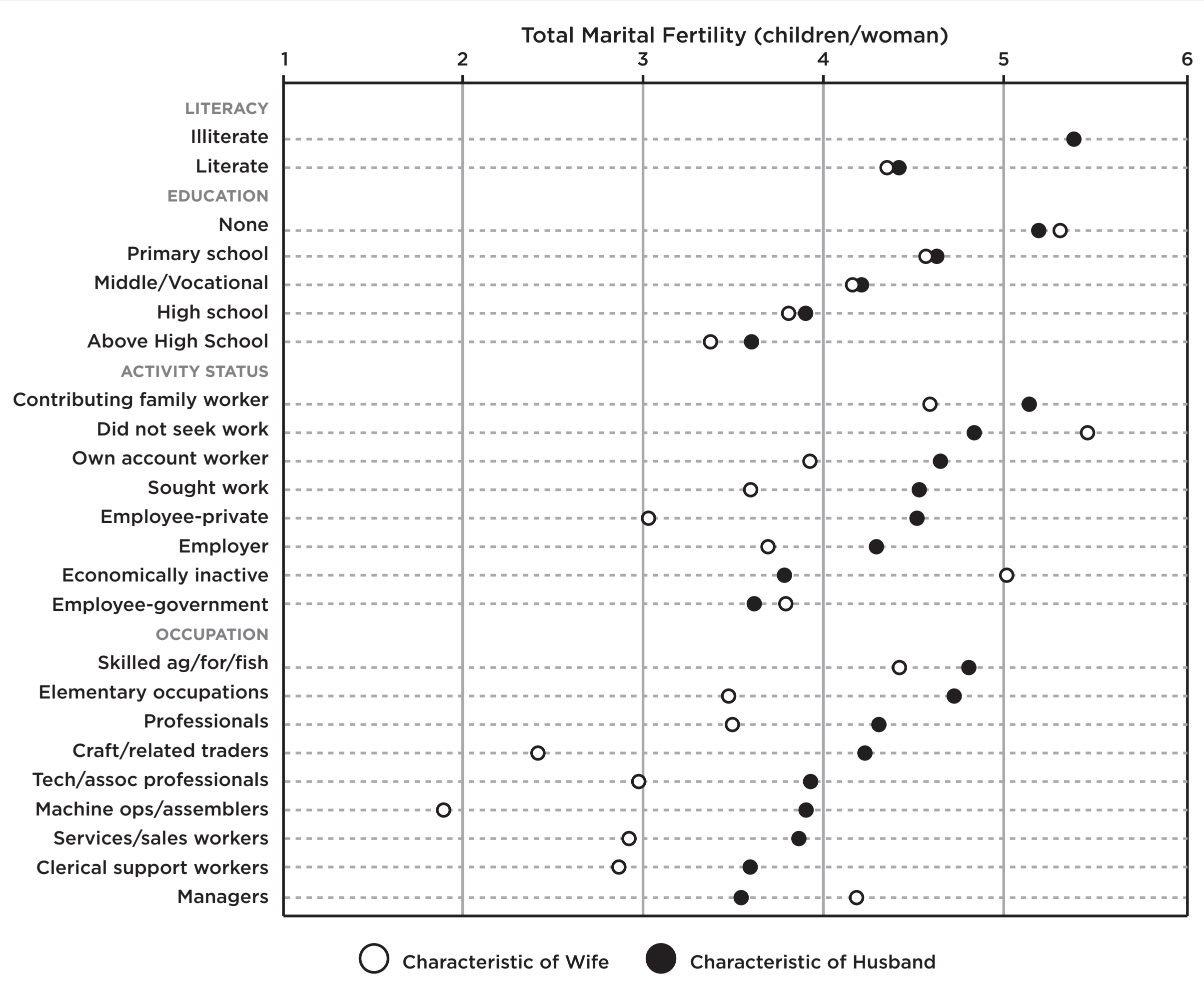
Source: Special tabulations, 2014 Census.

Note: TMF = Total Marital Fertility.

For activity status and occupation, in contrast, there is essentially no correlation between fertility of head couple wives in a given category and head couple wives whose husbands are in the same category. The observation for activity status is evidently consistent with Table 5.5.

Figure 6.4

Total marital fertility rates of head couple wives by selected characteristics of wife and husband, 2014 Census



Source: Tables 6.3 and 6.4.

Note: The values for illiterate husbands and wives are nearly identical, causing the filled circle representing husbands to be obscured by the unfilled circle for wives.

6.6 Fertility of non-head couple wives

Table 6.5 presents age-specific and total marital fertility rates for non-head couple wives.

Figure 6.5 compares the total marital fertility for head couple wives in each category with non-head couple wives in the same category. The figure shows a striking fertility difference between wives in non-head couples and those in head couples for literacy and education. Illiterate non-head couple wives had a total marital fertility of 4.3 children per woman, but illiterate head couple wives had a total marital fertility of 5.4 children per woman. In this respect, at least, head couple wives are far from representative of all married women.

Table 6.5

Age-specific and total marital fertility rates of non-head couple wives by selected characteristics of wife, 2014 Census

	Age-specific marital fertility rates (unadjusted)							
Characteristic	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**TMF**
Literacy of wife								
Literate	0.1518	0.1831	0.1613	0.1262	0.0797	0.0304	0.0066	3.70
Illiterate	0.1920	0.2126	0.1760	0.1381	0.0917	0.0414	0.0110	4.31
Education level of wife								
None	0.1879	0.2084	0.1737	0.1357	0.0907	0.0403	0.0105	4.24
Primary School	0.1526	0.1856	0.1639	0.1285	0.0834	0.0338	0.0076	3.78
Middle/Vocational School	0.1482	0.1793	0.1558	0.1203	0.0735	0.0257	0.0060	3.54
High School	0.1362	0.1648	0.1502	0.1166	0.0674	0.0227	0.0041	3.31
Above High School	0.1158	0.1506	0.1442	0.1223	0.0647	0.0190	0.0032	3.10
Activity status of wife								
Employee – government	0.1244	0.1631	0.1482	0.1276	0.0646	0.0198	0.0039	3.26
Employee – private	0.1608	0.1885	0.1516	0.1085	0.0736	0.0315	0.0088	3.62
Employer	0.1476	0.1742	0.1545	0.1202	0.0697	0.0310	0.0078	3.53
Own account worker	0.1747	0.1954	0.1630	0.1234	0.0752	0.0293	0.0076	3.84
Contributing family worker	0.1828	0.2048	0.1741	0.1328	0.0872	0.0351	0.0109	4.14
Sought work	0.1613	0.1818	0.1523	0.1171	0.0782	0.0291	0.0075	3.64
Did not seek work	0.1899	0.1913	0.1463	0.1122	0.1196	0.0167	0.0074	3.92
Economically inactive	0.1528	0.1846	0.1651	0.1323	0.0866	0.0354	0.0074	3.82
Occupation of wife								
Managers	0.0000	0.1077	0.1258	0.1435	0.0831	0.0253	0.0021	2.44
Professionals	0.0800	0.1422	0.1607	0.1508	0.1007	0.0292	0.0043	3.34
Technical/associate professionals	0.1082	0.1278	0.1397	0.1261	0.0672	0.0182	0.0042	2.96
Clerical support workers	0.0855	0.0976	0.1241	0.1140	0.0736	0.0224	0.0020	2.60
Services/sales workers	0.1064	0.1281	0.1187	0.0908	0.0570	0.0198	0.0051	2.63
Skilled agricultural workers	0.1699	0.1855	0.1512	0.1161	0.0752	0.0347	0.0099	3.71
Craft/related trades	0.0814	0.1052	0.1098	0.0914	0.0588	0.0221	0.0063	2.38
Machine operators/assemblers	0.0556	0.0747	0.0896	0.0851	0.0553	0.0179	0.0110	1.95
Elementary occupations	0.1096	0.1420	0.1234	0.0985	0.0709	0.0322	0.0083	2.92

Source: Special tabulations, 2014 Census.
Note: Non-head couple wives are married women who are neither the head of household nor the spouse of the head of household. No adjustment was made for errors in reporting of month and year of birth. TMF = Total marital fertility rate.

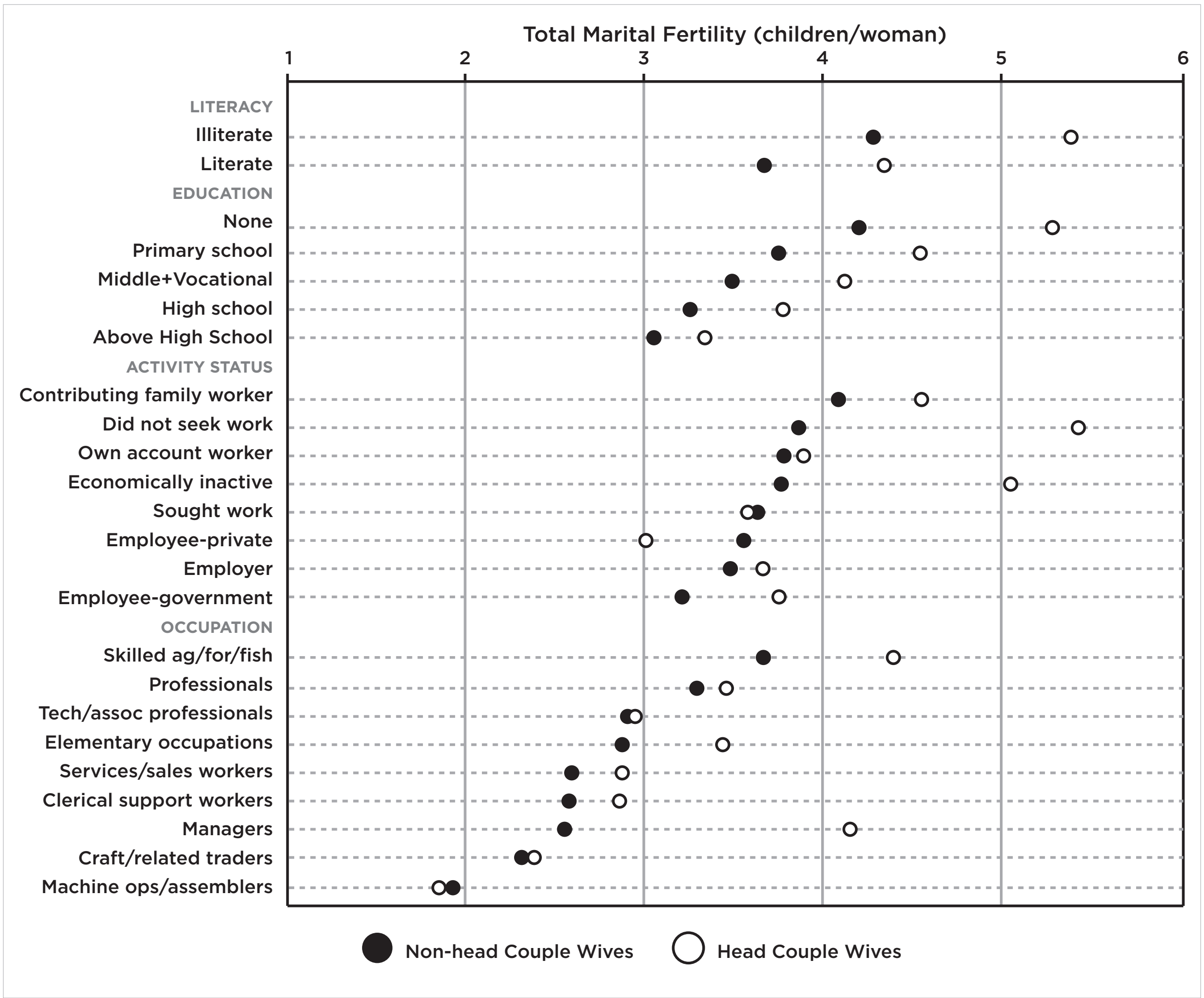
The level of difference between literate non-head wives (3.7 children per woman) and literate head couple wives (4.4 children per woman) is lower, but still substantial.

The comparison for education level shows a similar pattern. Non-head couple wives for all levels of education had lower fertility than head couple wives with the same level of education, but the differences decline steadily as the level of education increases. For women with more than high school education, the difference was only 0.3 children per woman: 3.1 children per woman for non-head couple wives compared with 3.4 children per woman for head couple wives.

The systematic differences in fertility between non-head couple and head couple wives observed for literacy and education levels are not observed for economic activity or occupation. Figure 6.5 shows no clear pattern for the economic activity characteristics, while occupation shows a clear tendency for fertility of both non-head couple and head couple women to decline from higher values for skilled agricultural, forestry and fishery workers, to lower values for machine operators and assemblers. The relatively high fertility of head couple skilled agricultural workers (4.4 children per woman) and to a lesser extent managers (4.2 children per woman), are outliers.

Figure 6.5

Total marital fertility rates of non-head couple and head couple wives by selected characteristics of wife, 2014 Census



Source: Tables 6.4 and 6.5

Chapter 7. Conclusion

This conclusion reviews the issues encountered during the production of this report that may be of interest to the Government of Myanmar's Department of Population when producing future reports and to other interested persons. The discussion suggests several recommendations for statistical development in Myanmar, most fundamentally the development of a civil registration and vital statistics (CRVS) system that registers births, deaths, and other vital events. For a summary of key substantive findings of the report, see the Executive Summary.

7.1 Methodological issues

Census data on children ever born and recent births is widely used to estimate age-specific fertility rates and total fertility by one of several variants of the P/F ratio method, the original method developed by William Brass (Brass and Coal, 1968, pp. 88-104), the variant developed by James Trussell (United Nations Population Division, 1983, Chapter II, Section B, pp. 31-58), or the variant developed by Eduardo Arriaga (Arriaga, 1983).

The Arriaga method is designed to use data on mean children ever born taken from two or more censuses. The single census case is handled by assuming constant fertility, on which assumption values of the mean number of children ever born from the single census apply to any time in the past. This gives a synthetic "previous census" to which the two-census method may be applied (Arriaga, 1983, page 3). This is an ingenious and useful device, but it does not escape the constant fertility assumption.

The Arriaga variant is implemented at page 38 of United Nations, 2013, which states clearly that: "When children ever born data are only available at one point of time, the method can still be applied, although only under the case of constant fertility." This one-sentence qualification may, however, be overlooked.

None of these methods are suitable for Myanmar because they assume constant fertility. The method developed by Zaba (1981) does not assume constant fertility, but the method used in this report is considered preferable for the reasons noted in section 2.3.

7.2 Areas for further research

This report highlights certain quantitative findings, such as the high proportion of women who are never married throughout their lives. The proportion of women never married, for example at age 50, has been increasing over the years. This may be a result of behavioural or cultural factors, but analysis of these factors is beyond the scope of this report. Further studies or in-depth qualitative research to determine potential behavioural and cultural factors that may be contributing to, and impacting, on the proportions never married is recommended.

Further research is recommended to explore the factors that are contributing to low fertility levels in Myanmar over the years. It is important to undertake a more detailed analysis of the census data, as well as other data sources, to explore, through regression analysis, the main factors that are driving fertility levels down.

7.3 Computer applications for small area estimation

A primary rationale for conducting a population census is that a complete enumeration allows for the production of small area statistics. Producing fertility estimates for large numbers of small areas tends to be impractical unless supported by computer tools that make it possible to produce estimates for large numbers of small areas with a single ‘run’ of a computer program.

Suitably designed computer applications for estimation make it possible to write a program that ‘loops’ through a list of small areas, producing and outputting estimates for each area. If this is possible, estimates for tens, hundreds, or even thousands of small areas may be produced as easily as estimates for a single area.

Annex B, Table B1, presents estimates for over 500 subnational areas of Myanmar that were produced by a single run of a computer program. Had it been necessary to run a single estimation program 500 times, it might have been impractical to produce these estimates. Quite aside from the time and effort involved, this would have involved extensive, tedious and error-prone manual operations.

The program that produced the estimates was written in R, a high level programing language for statistical computing and graphics (R Core Team, 2015). The availability of similar computing facilities for other estimation procedures would facilitate realizing the potential for using population census data to produce small area estimates.

7.4 The next population census

Several difficulties encountered in producing this report suggest recommendations for the next population census. The first and most obvious recommendation is that the next population census in Myanmar should be carried out in 2024. Conducting population censuses on a regular (decennial) schedule is considered so important that the United Nations specifies “defined periodicity” as one of four essential features of a population census (United Nations Statistical Division, 2008, Chapter II, Section B, Subsection 4, paragraph 1.12).

> Censuses should be taken at regular intervals so that comparable information is made available in a fixed sequence. A series of censuses makes it possible to appraise the past, accurately describe the present and estimate the future. It is recommended that a national census be taken at least every 10 years.

Had censuses been undertaken in Myanmar in 2004 and 1994, several methods for assessing the accuracy of the 2014 Census age distribution might have been applied, but these methods require at least one prior census, and a 5-year or 10-year interval between censuses. The unavailability of any census more recent than 1983 foreclosed the possibility of applying these methods.

The analysis of marital sorting presented in Chapter 5 uses census information on relationships between persons in the same conventional households to identify married couples, but married couples can be identified only if (a) they are enumerated in the same household and (b) one of the spouses is identified as head of household.

The first limitation is in the nature of census-taking by conventional methods, but the second might be removed by including a “Line number of spouse” question for all married persons whose spouse lives in the same household. The idea is similar to including a question on “Line number of mother” for persons whose mother lives in the household, a question suggested by the United Nations (2008) at paragraph 2.122.

A more general issue is the utilization of census data to study household and household structure. Household structure is pertinent to economic analyses, in which the households may be more fundamental units than persons, and to social analyses of many kinds. Families are fundamental social units in every society, and census household information may provide a great deal of valuable information on them, but only if the relationship to head of household question provides a reasonably detailed and carefully thought through set of responses.

Accurate population age distributions are important for many reasons, including the possibility of estimating fertility trends from a single census by the reverse survival method (Spoorenberg, 2014a), the own-children method (Cho et al, 1984), and the birth history reconstruction method (Luther and Cho, 1988). As discussed in section 3.3, application of these methods was considered inadvisable for the 2014 Census due to the indications of age misreporting and age-selective omission.

Accurate age reporting may be limited by the cultural importance of age. If accurate knowledge of chronological age is culturally unimportant, respondents may not know the age of the persons on whom they report. In this situation, efforts to obtain accurate reports may bring rapidly diminishing returns. For societies experiencing social change, however, ignorance of age may be concentrated among older persons. If this is the case, it may be useful to focus on obtaining accurate age reports for younger persons. Accurate age reporting for people under age 50, and especially under age 25, is extremely important. It is recommended that efforts be made to improve the quality of age reporting in the next census.

Consideration may be given to including a question on age at first marriage in the next census, but the value of this question depends on the accuracy of age reporting as well as on the accuracy of reporting of age at, or time of, a sometimes distant event. Without substantial improvement in the quality of age reporting, the value of an age at first marriage question may be minimal.

7.5 Development of civil registration and vital statistics (CRVS)

Primary fertility statistics, such as age-specific fertility rates, are defined as numbers of births divided by corresponding numbers of women “at risk: of having these births. (The same is true of primary mortality statistics). Numbers of births are classically provided by a civil registration and vital statistics (CRVS) system. Civil registration and vital statistics systems are discussed in detail in the United Nations Statistics Division (2014b) and also by the World Health Organization (WHO, 2016).

When civil registration systems do not exist, or are incompletely developed, the alternative sources for fertility statistics are population censuses and nationally representative household surveys. Estimates from these sources, useful as they are, should be regarded as an expedient to be used only until a CRVS system has been developed.

Estimates from censuses and surveys are in no way comparable to estimates from a well-developed CRVS system. A CRVS system is the only system capable of providing annual and monthly statistics for large numbers of subnational areas. This information may be used for many purposes, but it is essential for evaluating the impact of health initiatives aimed at, for example, reducing child or maternal mortality.

The development of civil registration has languished for half a century, but the past decade has seen welcome initiatives, including those reported in the Lancet ‘Who counts?’ series (Setel et al, 2007; Mahapatra et al, 2007; Hill et al, 2007; Abou-Zahr et al, 2007; Horton, 2007; Lopez et al, 2007), and by the World Bank/World Health Organization (World Bank, 2014).

The second of the *Lancet’s* ‘Who counts’ papers observes that substantial investments have been made over the past few decades to develop and roll out disease control programmes but that supporting investments to strengthen vital statistics systems that would enable reliable assessment of these programmes have not been made. This reflects, the paper states, a general lack of vision by the worldwide health community. The WHO, in particular, has made little progress beyond the collection and dissemination of vital statistics for developed countries. (Mahapatra et al, 2007).

Poor progress on developing civil registration is, according to one comment on the series, the single most critical failure of development over the past 30 years (Horton, 2007). Another comment observes that every country in the world has the capacity to produce useful economic data and that the effort and expense of gathering and interpreting data on national income and trade balances are accepted costs of monitoring economic prospects in an international market. The health sector should raise similar expectations of national capacity to produce vital statistics (Lopez et al, 2007). The suggestion is that the paucity of civil registration systems in developing countries reflects a lack of commitment as much as the challenge of the task.

References

Abou-Zahr, Carla, John Cleland, Francesca Coullare, Sarah B Macfarlane, Francis C Notzon, Philip Setel, and Simon Szreter. 2007. The way forward (Who Counts? Series No.4). *The Lancet*, Vol. 370, No. 9601, pp 1791-1799, 24 November 2007.

Arriaga, Eduardo E. 1983. Estimating fertility from data on children ever born by age of mother. U.S. Bureau of the Census, International Research Document No. 11, ISP-RD-11. Washington, DC: U.S. Government Printing Office.

Arriaga, Eduardo, Peter D Johnson and Ellen Jamison. 1994. *Population Analysis with Microcomputers*. Volume I, Presentation of Techniques, and Volume II, Software and Documentation. Avery, Christopher, Travis St. Clair, Micheal Levin and Kenneth Hill. 2013. The 'own children' fertility estimation procedure: A reappraisal. *Population Studies*, **67**(2):171183.

Becker, G S. 1973. A theory of marriage: Part I. *Journal of Political Economy*, **81**(4):81346. [6]

Becker, G S. 1974. A theory of marriage: Part II. *Journal of Political Economy*, **82**(2):S11S26.

Bongaarts, John, and Griffith Feeney. 1998. On the quantum and tempo of fertility. *Population and Development Review*, **24**(2):271-291.

Bongaarts, John, and Tom Sobotka. 2012. A demographic explanation for the recent rise in European fertility. *Population and Development Review*, **38**(1):83-120.

Brass, William, and Ansley J Coale. 1971. *Methods for Estimating Fertility and Mortality from Limited and Defective Data*. Based on Seminars Held 16-24 September 1971 at the Centro Latino Americano de Demografia (CELADE) San Jose, Costa Rica. International Program of Laboratories for Population Statistics, The Department of Biostatistics, School of Public Health, and The Carolina Population Center. Chapel Hill, North Carolina, USA: The University of North Carolina at Chapel Hill.

Brass, William, and Ansley J Coale. 1968. 'Methods of Analysis and Estimation', Chapter 3, pages 88-150, of *The Demography of Tropical Africa*, by William Brass, Ansley J Coale, Paul Demeny, Don F Heisel, Frank Lorimer, Anatole Romaniuk, and Etienne Van de Walle. Princeton, New Jersey: Princeton University Press.

Caldwell, John C, P H Reddy, and Pat Caldwell. 1988. *The Causes of Demographic Change: Experimental Research in South India*. Madison, Wisconsin: the University of Wisconsin Press.

Charles, Kerwin Kofi, Erik Hurst, Alexandra Killewald. 2011. *Marital sorting and parental wealth*. Working Paper 16748, National Bureau of Economic Research [United States], Cambridge, Massachusetts, USA. Website: http://www.nber.org/papers/w16748 Accessed 2 October 2015.

Cho, Lee-Jay, Robert D Retherford, and Minja Kim Choe. 1984. *The Own-Children Method of Fertility Estimation*. Honolulu, Hawaii: Population Institute of the East-West Center.

References

Davis, Kinglsey. 1949 *Human Society*. New York: Macmillan and Company.

Davis, Kingsley. 1963. The Theory of Change and Response in Modern Demographic History. *Population Index*, **29**(4):345-366.

Department of Population. 1999. *Fertility and Reproductive Health Survey, 1997*. Ministry of Immigration and Population. Yangon, Myanmar.

Department of Population. 2003. *Myanmar Fertility and Reproductive Health Survey 2001*. Ministry of Immigration and Population. Yangon, Myanmar.

Department of Population. 2009. *Country Report on 2007 Fertility and Reproductive Health Survey*. Ministry of Immigration and Population. Nay Pyi Taw, Myanmar.

Department of Population. 2014. *The 2014 Myanmar Population and Housing Census, Provisional Results*, Census Report Volume 1. Ministry of Immigration and Population. Nay Pyi Taw, Myanmar.

Department of Population. 2014. *2014 Census Field Instructions Manual for Enumerators and Supervisor*. Ministry of Immigration and Population, Nay Pyi Taw, Myanmar.

Department of Population. 2015. *The 2014 Myanmar Population and Housing Census, The Union Report*, Census Report Volume 2. Ministry of Immigration and Population. Nay Pyi Taw, Myanmar.

Department of Population. 2016a. *The 2014* Myanmar *Population and Housing Census, Thematic Report on Mortality*. Ministry of Labour, Immigration and Population, Nay Pyi Taw, Myanmar.

Department of Population. 2016b. *The 2014 Myanmar Population and Housing Census, Thematic Report on Migration and Urbanization*. Ministry of Labour, Immigration and Population, Nay Pyi Taw, Myanmar.

Dyson, Tim. 2010. *Population and Development: The Demographic Transition*. London: Zed Books Ltd.

Dyson, Tim, and Mike Murphy. 1985. The onset of fertility transition. *Population and Development Review*, **11**(3):399-440.

Ermisch, John, Marco Francesconi, and Thomas Siedler. 2006. Intergenerational mobility and marital sorting. *The Economic Journal*, **116**(513):659-679.

Esteve, Albert, and Clara Cortina. 2006. Changes in educational assortative mating in contemporary Spain. *Demographic Research*, **14**(17):405-428. Website: www.demographic-research.org/Volumes/Vol14/17/ Accessed 2 October 2015.

References

Feeney, Griffith. 1986. Period parity progression measures of fertility in Japan. NUPRI Research Paper No. 35, Nihon University Population Research Institute, Tokyo. Website: gfeeney.com/publications/1986-pppmf-in-japan/ Accessed 18 September 2015.

Feeney, Griffith. 1988. The use of parity progression models in evaluating family planning programmes. In *African Population Conference, Dakar 1988*, Volume 3. International Union for the Scientific Study of Population.

Feeney, Griffith. 1991. Child survivorship estimation: Methods and data analysis. *Asian and Pacific Population Forum*, **5**(2-3):51-55/76-87.

Feeney, Griffith. 1994. Fertility decline in East Asia. *Science*, **266**, 2 December 1994, pp.1518-1523.

Feeney, Griffith. The Analysis of Children Ever Born Data for Post-Reproductive Age Women. Notes on Notestein Seminar, Office of Population Research, Princeton University, 14 November 1995.

Feeney, Griffith. 2014. Literacy and Gender: Development Success Stories. *Population and Development Review*, **40**(3):545-552.

Feeney, Griffith, and Andrew Mason. 2001. Population in East Asia. In Andrew Mason, Ed., *Population Change and Economic Development in East Asia: Challenges Met, Opportunities Seized*. Stanford, California: Stanford University Press.

Feeney, Griffith, and Yasuhiko Saito. 1985. Progression to First Marriage in Japan: 1870-1980. NUPRI Research Paper Series No. 24, March 1985. Tokyo: Nihon University Population Research Institute.

Festy, Patrick, and France Prioux. 2002. *An Evaluation of the Fertility and Family Surveys Project*. New York and Geneva: United Nations.

Greenwood, Jeremy, Nezih Guner, Georgi Kocharkov, and Cezar Santos. 2014. Marry Your Like: Assortative Mating and Income Inequality. NBER Working Paper No. 19829. Washington DC: [United States] National Bureau of Economic Research. Website: http://repository.upenn.edu/

Hajnal, John. 1953. Age at marriage and proportions marrying. *Population Studies*, 7(2):111-136. Website: faculty.washington.edu/samclark/soc533/Syllabus/Readings/4/1/

Hanjal, John. 1965. European marriage patterns in perspective. Pages 101-143 in D V Glass and D E Eversley, (eds.), *Population in History: Essays in Historical Demography.* London: Edward Arnold Ltd.

References

Hakobyan, Shushanik. 2015. Educational assortative mating in Armenia. *Armenian Journal of Economics*, **1**:136-147.

Hartanto, Wandy, and Terrence H Hull. 2009. Fertility Estimates of Indonesia for Provinces Adjusting Under-Recording of Women in 2002-3 and 2007 IDHS. BPS Contract (088/CP7/VIII/2009) with UNFPA, November 2009.

Hill, Kenneth, Alan D Lopez, Kenji Shibuya, and Prabhat Jha. 2007. Interim measures for meeting needs for health sector data: births, deaths, and causes of death (Who Counts? Series No, 3). *The Lancet*, Vol 370, No. 9590, pp 1526, 3 November 2007.

Henry, Louis. 1961. Some data on natural fertility. *Eugenics Quarterly*, **8**(2):81-91.

Hoem, J M, and C Muresan. 2011. The Total Marital Fertility Rate and its extensions. *European Journal of Population*, **27**(3):295-312.

Horton, Richard. Counting for Health (Comment on Who Counts? Series). *The Lancet*, Vol 370, No. 9601, p1526, 3 November 2007.

Hull, Terrence H, and Wandy Hartanto. 2009. Resolving contradictions in Indonesian fertility estimates. *Bulletin of Indonesian Economic Studies*, **45**(1):6171.

International Union for the Scientific Study of Population. 2011a. *Tools for Demographic Estimation: Overview of fertility estimation methods on the P/F ratio*. IUSSP. Website: http://demographicestimation.iussp.org/content/overview-fertility-estimation-methods-based-pf-ratio

International Union for the Scientific Study of Population. 2011b. *Tools for Demographic Estimation: The relational Gompertz model.* IUSSP. Website: http://demographicestimation.iussp.org/content/relational-gompertz-model

Kalmijn, Matthijs. 1994. Assortative mating by cultural and economic occupational status. *American Journal of Sociology*, **100**(2):422-452.

Kawanami, Koko. 2001. Can women be celibate? Sexuality and abstinence, in Theravada Buddhism. In Sobo, Elisa Janine, and Sandra Bell, *Celibacy, Culture, and Society: The Anthropology of Sexual Abstinence*. Madison, Wisconsin, USA: University of Wisconsin Press.

Liu, Haoming, and Jingfeng Lu. 2006. Measuring the degree of assortative mating. *Economics Letters,* **92**:317-322.

Lopoez, Alan D, Carla AbouZahr, Kenji Shibuya, and Laragh Gollogly. 2007. Keeping count: births, deaths, and causes of death (Comment on Who Counts? Series). *The Lancet*, Vol. 370, No. 9601, pp1744-1746, 24 November 2007.

References

Luther, Norman Y., and Lee-Jay Cho. 1988. Reconstruction of Birth Histories from Census and Household Survey Data. *Population Studies*, **42**(3):451-472.

Mahapatra, Prasanta , Kenji Shibuya, Alan D Lopez, Francesca Coullare, Francis C Notzon, Chalapati Rao, and Simon Szreter. 2007. Civil registration systems and vital statistics: successes and missed opportunities (Who Counts? No. 2). *The Lancet*, Vol. 370 No. 95599, pp1653-1663, 10 November 2007.

Maung, M Ismail Khin. 1986. The population of Burma: An analysis of the 1973 Census. *Papers of the East-West Population Institute*, Number 97, April 1986. Honolulu, Hawaii, USA: East-West Center.

Ministry of Health. 2014. Heath in Myanmar. Ministry of Health. Nay Pyi Taw, Myanmar.

Ministry of Health. 2014. *Five-Year Strategic Plan for Reproductive Health* (2014-2018). Ministry of Health. Nay Pyi Taw, Myanmar.

Ministry of Home and Religious Affairs. 1986. *Burma: 1983 Population Census*. Rangoon: The Socialist Republic of the Union of Burma.

Ministry of Immigration and Population. 1995. *Population Changes and Fertility Survey 1991*. Yangon, Myanmar.

Mosteller, Frederik, and John W Tukey. 1977. *Data Analysis and Regression: A Second Course in Statistics.* Reading, Massachusetts: Addison-Welsey Publishing Company.

Moultrie, Tom, and Rob Dorrington. 2008. Sources of error and bias in methods of fertility estimation contingent on the P/F ratio in a time of declining fertility and rising mortality. *Demographic Research*, **19**(46):1635-1662.

Moultrie, Tom, Rob Dorrington, Allan Hill, Kenneth Hill, Ian Timus and Basia Zaba. 2013. *Tools for Demographic Estimation*. Paris: International Union for the Scientific Study of Population. Website: demographicestimation.iussp.org/content/get-pdf-book-website

National Institute of Statistics [Cambodia]. 2009. *General Population Census of Cambodia 2008: National Report on Final Census Results*. Phnom Penh: National Institute of Statistics, Ministry of Planning.

Nyi. 2005. *The Determinants of Age at First Marriage in Myanmar*. MA Thesis, Faculty of Graduate Studies, Mahidol University, Thailand. ISBN 974-04-6416-5.

Potter, Joseph E. 1977. Problems in using birth-history analysis to estimate trends in fertility. *Population Studies*, **31**(2):335-364.

References

R Core Team. 2015. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. Website: www.r-project.org/

Retherford, Robert D, and Lee-Jay Cho. 1978. Age-parity-specific birth rates and birth probabilities from census or survey data on own children. *Population Studies*, **32**:567-581.

Ryder, Norman B. 1960. The structure and tempo of current fertility. In Universities-National Bureau of Economic Research, (ed.), *Demographic and Economic Change in Developed Countries,* pp. 117-136. Website: www.nber.org/chapters/c2384.pdf

Schmertmann, Carl, Suzana M. Cavenaghi, Renato M. Assuno, and Joseph E. Potter. 2013. Bayes plus Brass: Estimating total fertility for many small areas from sparse census data. *Population Studies*, **67**(3):255-273.

Smith, Peter C. 1978. Indices of nuptiality: Asia and the Pacific. *Asian and Pacific Census Forum* **5**(2):1-2 and 9-13.

Schwartz, Christine R. 2013. Trends and variation in assortative mating: Causes and consequences. *Annual Review of Sociology*, **39**:451-470.

Schwartz, Christine R., and Robert D. Mare. 2005. Trends in educational assortative marriage from 1940 to 2003. *Demography*, **42**(4):62146.

Setel, Philip W, Sarah B Macfarlane, Simon Szreter, Lene Mikkelsen, Prabhat Jha, Susan Stout, Carla Abou-Zahr. 2007. A scandal of invisibility: making everyone count by counting everyone (Who Counts? No. 1). *The Lancet*, Vol 370, N0, 9598, pp1569-1577, 3 November 2007.

Spoorenburg, Thomas. 2013. Demographic changes in Myanmar since 1983: An examination of official data. *Population and Development Review*, **39**(2):309-324.

Spoorenberg, Thomas. 2014a. Reverse survival method of fertility estimation: An evaluation. *Demographic Research*, **31**(9):217-246. Website: http://demographic-research.org/volumes/vol31/9/default.htm

Spoorenberg, Thomas. 2014b. Reconciling discrepancies between registration-based and survey-based fertility estimates in Mongolia. *Population Studies* On-line first article.

United Nations Population Division. 1983. *Manual X: Indirect Techniques for Demographic Estimation*. United Nations, New York.

United Nations Population Division. 2012*. World Population Prospects: The 2015 Revision*. United Nations, New York.

References

United Nations Population Division. 2013. MortPak for Windows (Version 4.3). New York: United Nations. Website: http://www.un.org/en/development/desa/population/publications/pdf/mortality/mortpak_manual.pdf

United Nations Statistics Division. 2004. *Handbook on the Collection of Fertility and Mortality Data*. Department of Economic and Social Affairs, United Nations. New York. Website: unstats.un.org/unsd/demographic/standmeth/handbooks/Handbook_Fertility_Mortality.pdf

United Nations Statistics Division. 2008. *Principles and Recommendations for Population and Housing Censuses*, Revision 2. Department of Economic and Social Affairs, United Nations. New York.

United Nations Statistics Division. 2014a. Population by marital stats, age, sex and urban/rural residence. Population database. Website: http://data.un.org/

United Nations Statistics Division. 2014b. *Principles and Recommendations for a Vital Statistics System, 3rd Revision*. Statistical Papers, Series M, No. 19/Rev.3. Department of Economic and Social Affairs United Nations New York. Website: unstats.un.org/unsd/Demographic/standmeth/principles/

United States Census Bureau. 1994. Population Analysis System (PAS). Computer application. Website: www.census.gov/population/international/software/pas/ For documentation see Arriaga et al (1994) above.

World Bank. 2014*. Global Civil Registration and Vital Statistics: Scaling Up Investment Plan 2015-2024*.

World Health Organization. 2016. *Civil registration and vital statistics (CRVS)*, Geneva.

Xenos, Peter, and Socorro A Gultiano. 1992. Trends in Female and Male Age at Marriage and Celibacy in Asia. Papers of the East-West Center Program on Population, Number 120. Honolulu, Hawaii, USA: East-West Center. Website: http://scholarspace.manoa.hawaii.edu/bitstream/handle/10125/3978/popop120.pdf?sequence=1

Xie, Yu, Siwei Cheng, and Xiang Zhou. 2015. Assortative mating without assortative preference. *Proceedings of the National Academy of Sciences of the United States of America*, **112**(19):59745978.

Zaba, Basia. Use of the relational Gompertz model in analysing fertility data collected in retrospective surveys. CPS Working Paper No. 81-2, March 1981. London: Centre for Population Studies, London School of Hygiene & Tropical Medicine, University of London.

Glossary of terms and definitions

Adolescent fertility rate
The age-specific fertility rate (ASFR) for women aged 15-19 years, typically multiplied by 1,000 for more convenient presentation.

Age-specific fertility rate (ASFR)
The age-specific fertility rate for a given age group and time period is the number of births to women in the age group during the time period divided by the person-years lived by women in the age group during the period. Person-years lived may be approximated by the mid-period population multiplied by the length of the period.

Birth cohort
A population of persons born during a given time period.

Completed fertility
The average number of children born to a cohort of women at the end of their reproductive lives.

Conventional household
A household enumerated using the Main Questionnaire of the 2014 Population and Housing Census of the Union of Myanmar.

Crude birth rate
The number of births to a population during a time period divided by the average population size during the period multiplied by the length of the period.

Crude death rate
The number of deaths in a population during a time period divided by the average population size during the period multiplied by the length of the period.

Head couple
A married couple living together in the same conventional household where either spouse is the head of the household.

Head couple wife
A married woman enumerated in the same conventional household as her husband, where either the husband or the wife is the head of household.

Household population
Persons enumerated in conventional households.

Institution population
Persons enumerated using the Institution Questionnaire of the 2014 Population and Housing Census. The institutions included hotels/guest houses, hospitals, orphanages, military barracks, etc.

Live birth order
For a live birth, one plus the number of previous live births to the woman. *Total birth order* is defined in the same way, but counting stillbirths as well as live births.

Marital sorting
The tendency for people to choose spouses with characteristics similar to their own.

Mean number of children ever born
The ratio of the number of children born alive to all women in a particular age group to the number of women in that age group.

Non-head couple wife
A married woman enumerated in a conventional household who is not a head couple wife. This includes women enumerated in a different household to their husband, women enumerated in the same household with their husband but where their husbands are not the household head, and women whose husbands were abroad at the time of the Census.

Parity
The number of live births a woman has had at any given time.

Population Growth Rate
The average annual instantaneous population growth rate is defined as $r = lnP2/P1/t$ where r denotes the growth rate, $P\ 1$ and $P\ 2$ population size at the beginning and end of the period, and t the length of the time period.

Singluate mean age at marriage
Singulate mean age at marriage refers to the average age at first marriage (average number of years of single life), before a certain age (defined at 50), of the population born in the same year.

Total fertility rate
A summary measure of the level of fertility in a population. It is the average number of children per woman that would be observed for the reproductive age span for a birth cohort of women who experience given age-specific fertility rates. When the reproductive age span is taken to be 15-49 years, and birth rates are given for five-year age-groups, total fertility is calculated as five times the sum of the age-specific fertility rates for ages 15-19 through to 45-49.

Total marital fertility rate
A summary measure of the level of marital fertility in a population. When the reproductive age span is taken to be 15-49 years, and birth rates are given for five-year age-groups, total marital fertility is calculated as five times the sum of the age-specific marital fertility rates for ages 15-19 through to 45-49. It is interpreted as the average number of children per woman that would be observed at the end of the reproductive age span for a birth cohort of women where all women marry at exact age 15 years and experience the given age-specific marital fertility rates.

Appendices

Appendix A.
Method of Estimation

This appendix describes the estimation procedure developed to produce fertility estimates from the 2014 Myanmar Census data on children ever born, and births during the 12 months prior to the Census. It includes a complete illustrative calculation of the estimated fertility for the Union of Myanmar that may be checked against the estimates given in Tables 2.1 and 2.2. Illustrative calculations are also shown for data from the 2001 and 2007 Fertility and Reproductive Health Surveys.

A1 Input data

Input 1: The distribution of all women of reproductive age in conventional households by single year of age.

The restriction in the analyses in this report to women in conventional households is necessary because fertility information was not collected for women in institutional households. The inclusion of all women, including never married women for whom fertility information was not collected, is necessary because the logic of the estimation procedure requires the calculation of age-specific fertility rates, which take all women aged 15-49 as the denominator. The questionnaire addresses fertility questions to women aged 15 years and over, so the reproductive age span is taken to begin at age 15.

Input 2: The distribution of children ever born to reproductive age women in conventional households by five-year age group of mother.

The method does not require information on women of post-reproductive age (50 and over) or by single years of age, but this information is useful for assessing data quality. The tabulations produced therefore give the distribution of children ever born to women in conventional households aged 15 years and over by single year of age of mother.

Input 3: Births during the 12 months prior to the census are calculated for each woman from the responses to the questions on month and year of most recent live birth.

The tabulations produced give the distribution of births during the 12 months prior to the Census to ever-married women in conventional households by single year of age of mother.

These three input distributions are shown in the first three columns of Table A1 for ages 15-50. Note that age 50 is included in the table because some births to women age 50 at the time of the Census occurred when the woman was aged 49 at the time of their most recent live birth.

Distributions of women and recent births by single years are essential to the method. Traditional P/F ratio methods use data by five-year age groups. Given that calculations are all but universally done on computers, however, there is no reason not to use data by single years if it is advantageous to do so. Input data by single year of age eliminates the need for introducing a model for the age pattern of fertility. This simplifies the calculation of the estimates and makes the logic of the method more transparent.

Use of the 2014 Census data to estimate recent fertility requires the assumption that births to never married women are statistically negligible. This is the case for any method of estimation. As noted in section 2.2, it is believed that births to never married women in Myanmar, as a whole, are in fact statistically negligible. Questions on non-marital fertility have not been included in previous population censuses or national surveys, so nationally representative statistical evidence to confirm or refute the validity of the assumption does not exist.

A2 Preliminary calculations

Step 1: Calculate the mean number of children ever born for women in five-year age groups.

The upper section of Table A1 shows the number of women and children ever born by single years of age. The lower section gives the same data for five-year age groups. The mean number of children ever born (MCEB) for the five-year age groups is simply the number of children ever born divided by the number of women. Numbers of children ever born by single year of age are not required for the estimation process, but are shown here because they may be useful for an assessment of data quality.

Step 2: Calculate person-years lived (PYL) during the year prior to the census for women at single years of age from 15 to 49, and person-years lived by women during the same period in five-year age groups.

Person-years lived by women age x is estimated as the average of the number of women aged x at the end of the year, and women aged x at the beginning of the year. Person-years lived by women in each five-year age group during the 12 months prior to the Census is simply the sum of the person-years lived by women at each single year of age in the group.

Step 3: Calculate single year age-specific fertility rates by age of mother at the time of the Census.

The rate for age x is simply the number of recent births to women aged x at the time of the Census divided by the number of women aged x at the time of the Census. Note that these are not standard central rates, defined as the number of births during the 12 months prior to the Census to women aged x at time of birth divided by person-years lived by women aged x during the same period.

Step 4: Calculate standard age-specific fertility rates for five-year age groups.

Births to women in five-year age groups are calculated by summing births to women aged x at birth over the single years of age in the age group. Calculation of births to women aged x at birth, though straightforward in principle, is complicated by the difference between births during a year to women aged x *at the birth* and births during the year to women aged x at the end of the year of the birth.

Numbers of births for each single year of age x are estimated by assuming separation factors of one half. Thus one half of the births occurring during the 12 months prior to the Census to women aged x at the time of the Census are assumed to occur to women aged x at birth, and the remaining half to women $x - 1$ at birth. Ages 15 and 50 are exceptions to this general rule, however, because these ages mark the beginning and end of the reproductive age span.

Cancellation of terms simplifies the calculation. Births to women aged 20-24, for example, may be calculated as one half of the number of births to women aged 20 *plus* the numbers of births for ages 21-24 *plus* half the number of births to women aged 25. The same rationale applies to all five-year age groups other than 15-19 and 45-49. Births to women aged 15-19 are calculated as births to women aged 15-19 plus half of births to women aged 20. Births to women aged 45-49 are calculated as half the number of births to women aged 45 plus births to women aged 46-50.

Births to women in each five-year age group at the time of birth are then divided by the number of person-years lived by women in the age group to give the age-specific fertility rate.

Table A1

Input data and preliminary calculations for estimation of recent fertility, 2014 Census

Age	Women	CEB	Births	PYL	MCEB (P)	ASFR	Implied MCEB (F)	P/F
15	460,282	1,297	1,108	444,273	0.0028	0.0024	0.0024	1.1706
16	428,263	4,444	2,668	430,880	0.0104	0.0062	0.0086	1.2014
17	433,497	12,572	6,698	461,901	0.0290	0.0155	0.0241	1.2040
18	490,305	34,961	16,364	448,569	0.0713	0.0334	0.0575	1.2409
19	406,832	51,543	21,461	458,847	0.1267	0.0528	0.1102	1.1495
20	510,862	130,087	39,639	453,067	0.2546	0.0776	0.1878	1.3559
21	395,271	115,272	33,228	405,113	0.2916	0.0841	0.2719	1.0727
22	414,955	165,214	40,200	412,592	0.3981	0.0969	0.3687	1.0797
23	410,228	209,982	43,698	396,291	0.5119	0.1065	0.4753	1.0770
24	382,354	241,584	43,230	427,445	0.6318	0.1131	0.5883	1.0739
25	472,535	384,937	55,662	423,434	0.8146	0.1178	0.7061	1.1536
26	374,332	333,586	44,351	385,181	0.8912	0.1185	0.8246	1.0807
27	396,030	408,259	47,131	417,308	1.0309	0.1190	0.9436	1.0925
28	438,586	525,071	52,273	408,908	1.1972	0.1192	1.0628	1.1264
29	379,230	495,272	44,816	443,239	1.3060	0.1182	1.1810	1.1059
30	507,248	780,792	57,690	427,411	1.5393	0.1137	1.2947	1.1889
31	347,574	553,932	38,804	368,467	1.5937	0.1116	1.4064	1.1332
32	389,360	677,260	40,795	386,200	1.7394	0.1048	1.5111	1.1511
33	383,039	722,983	38,647	356,135	1.8875	0.1009	1.6120	1.1709
34	329,231	653,033	31,212	385,552	1.9835	0.0948	1.7068	1.1621
35	441,872	961,552	38,369	386,171	2.1761	0.0868	1.7937	1.2132
36	330,470	743,235	26,769	334,721	2.2490	0.0810	1.8747	1.1997
37	338,971	802,436	25,036	362,297	2.3673	0.0739	1.9485	1.2149

Table A1 (continued)

Input data and preliminary calculations for estimation of recent fertility, 2014 Census

Age	Women	CEB	Births	PYL	MCEB (P)	ASFR	Implied MCEB (F)	P/F
38	385,623	967,040	26,275	352,408	2.5077	0.0681	2.0167	1.2435
39	319,193	828,936	18,914	371,895	2.5970	0.0593	2.0759	1.2510
40	424,596	1,157,759	20,310	351,296	2.7267	0.0478	2.1237	1.2839
41	277,996	771,305	11,283	323,070	2.7745	0.0406	2.1643	1.2819
42	368,143	1,073,185	12,545	351,819	2.9151	0.0341	2.1984	1.3260
43	335,495	1,017,192	9,073	314,952	3.0319	0.0270	2.2255	1.3624
44	294,409	912,551	5,676	347,566	3.0996	0.0193	2.2447	1.3808
45	400,722	1,273,487	5,620	344,778	3.1780	0.0140	2.2588	1.4070
46	288,834	928,626	2,542	288,865	3.2151	0.0088	2.2676	1.4179
47	288,895	942,847	1,833	301,095	3.2636	0.0063	2.2739	1.4353
48	313,294	1,045,593	1,589	282,755	3.3374	0.0051	2.2790	1.4644
49	252,216	857,933	984	305,062	3.4016	0.0039	2.2829	1.4900
50	357,908	1,241,996	1,332	-	-	-	-	-
---	---	---	---	---	---	---	---	---
15-19	2,219,179	104,817	68,119	2,244,469	0.0472	0.0303	0.0398	1.1876
20-24	2,113,670	862,139	208,007	2,094,507	0.4079	0.0993	0.3673	1.1105
25-29	2,060,713	2,147,125	245,247	2,078,070	1.0419	0.1180	0.9366	1.1125
30-34	1,956,452	3,388,000	197,488	1,923,764	1.7317	0.1027	1.4891	1.1629
35-39	1,816,129	4,303,199	126,334	1,807,491	2.3694	0.0699	1.9343	1.2250
40-44	1,700,639	4,931,992	51,542	1,688,702	2.9001	0.0305	2.1876	1.3257
45-49	1,543,961	5,048,486	10,424	1,522,554	3.2698	0.0068	2.2713	1.4396

Source: Special tabulation of 2001 Fertility and Reproductive Health Survey Data.

Note: CEB = children ever born. Births = births to ever-married women during the 12 months prior to the Census. PYL = person-years lived. MCEB = mean children ever born. ASFR = age-specific fertility rate. For Births and ASFRs by single year of age, age refers to age of woman/mother at the time of the Census. For Births and ASFRs for five-year age groups, age refers to age of woman/mother at time of birth.

Supplementary information

As noted above, Table A1 includes information that is not required by the estimation procedure, but may be useful for comparisons with the results of traditional P/F ratio methods. The last two columns of the table, for example, show mean numbers of children ever born implied by the assumption that fertility has been constant for 35 years prior to the Census at the level of the age-specific birth rates calculated from reported births during the year prior to the Census. The method described in this appendix does not use this information. It is provided in the table to facilitate comparisons with traditional P/F ratio methods.

The implied mean numbers of children ever born by single years of age are simply the cumulative sum of the age-specific fertility rates in Table A1. This is a consequence of the rates being given by age of mother at the time of the Census, which means that the rates refer to births to single year age cohorts. The implied MCEB value in the second row, for example, 0.0086, is the sum of the unadjusted ASFR values 0.0024 and 0.0062, the MCEB value in the second row is the sum of the ASFR values 0.0024, 0.0062 and 0.0155, and so on. Having input data by single years of age makes it unnecessary to introduce a model for the age pattern of fertility.

A3 Fertility change models: An alternative to P/F methods

The evidence of fertility decline presented in Chapter 3 invalidates the constant fertility assumption made by P/F ratio methods. This does not mean that these methods cannot be applied, only that their results will err as a result of the invalidity of the assumption. The problem with applying P/F ratio methods is not so much that the results will err; it is possible that the magnitude of the error will be small. The problem is rather that the magnitude of the error is unknowable without the kind of modelling exercise carried out, for example, by Moultrie and Dorrington (2008).

The relational Gompertz method presented in Moultrie et al (2013), not strictly speaking a P/F ratio method, does not assume constant fertility and might be applied to the Myanmar data. This method makes assumptions that are not needed if data are available by single years of age, however, and is conceptually more complex than the new method described in this, and the following section.

An estimation procedure that does not assume constant fertility must posit a model of fertility change over time. Schmertmann et al (2013) suggest a two-stage approach to this modelling. The first stage is factoring the matrix of single year age-specific fertility rates for the 35 years prior to a census into age pattern and total fertility level components:

$$f(x,\ t) = TF_{(x)}(t) \times f^N$$

where $f(x,\ t)$ denotes the age-specific fertility rate for age x in year t, $TF\ (t)$ total fertility for year t, and $f^N\ (x)$ a normalized age pattern of fertility. The function $f^N\ (x)$ may be estimated from the age-specific birth rates calculated from births during the year prior to the Census. This factorization reduces modelling that matrix of age-specific fertility rates to modelling changes in the level of total fertility, the second stage. Schmertmann et al posit the one parameter model $TF\ (t) = e^{rt}TF$. Given the pattern of fertility change in Myanmar, however, this model would not be appropriate for estimating fertility from the 2014 Census.

An alternative model better suited to Myanmar assumes constant total fertility of TF children per woman for T years prior to the Census, preceded by total fertility changing at rate r children per woman per year. The appropriateness of this model is supported by Feeney and Mason (2001) who found, using the then current United Nations World Population Prospects estimates, that a piecewise linear model gives a reasonable fit to observe fertility trends in countries in which decline was well established.

Introducing an explicit model of fertility change fundamentally changes the logic of estimating current fertility from census data on children ever born and births during the 12 months prior to the Census. Given a parameterized model of fertility change, fertility estimates are produced by fitting this model to observed mean numbers of children ever born. It may be possible to obtain closed form formulas for some change models, but this is less important than it would have been in the past because modern computational power allows the use of general numerical methods. The following section shows how to estimate current fertility in Myanmar using these methods.

A4 Estimation of total fertility and age-specific fertility rates

Step 5: Estimate TF, T, and r.

Given any set of values for TF, T, and r, the matrix of single year ASFRs for the 35 years prior to the Census may be calculated using the normalized age pattern of fertility $f^N(x)$.

Fitted values of the mean number of children ever born for women aged x corresponding to these parameter values are calculated from this matrix by summing over cohort diagonals. Fitted values of the mean number of children ever born for five-year age groups may then be calculated from the matrix of single year age-specific fertility rates for the 35 years prior to the Census. The mean number of children ever born for women aged x is calculated by cumulating up diagonals in the matrix. Children ever born to women in each five-year age group is calculated as the sum of the mean number of children ever born for women aged x multiplied by the number of women aged x over all ages in the group. The mean number of children ever born is then calculated by dividing by the number of women in the group.

Values of TF, T, and r can then be estimated by choosing them to minimize the sum of squared differences between the observed and fitted mean number of children ever born values for five-year age groups. Minimization may be effected by standard numerical minimization algorithms.

The results for the Union are shown in Table A2. The estimate of total fertility at the time of the Census, rounded to two decimal points, is 2.51 children per woman. This is the final estimate of recent fertility. The other parameter estimates shown in the table indicate that total fertility was constant for about five and a half (5.4645) years prior to the Census, and that total fertility in earlier years declined at 0.066 children per woman per year, or 0.66 children per woman per decade. Providing estimates of fertility change during the decades prior to the Census is a potential advantage of estimation methods that model fertility change, but exploiting this potential would require further research. Only the estimate TF of recent total fertility is used in this report.

Step 6: Examine the plot of observed and fitted mean children ever born values by age.

Before accepting the results it is advisable to plot the observed and fitted mean children ever born values by age to provide a visual indication of goodness of fit. Figure A1 plots observed and fitted mean number of children ever born by age, showing how good the fit is. It also shows implied mean number of children ever born in Table A1.

Step 7: Estimate age-specific birth rates corresponding to the estimated total fertility rate.

Estimated age-specific fertility rates for five-year age groups are calculated by multiplying the unadjusted rates in the 'ASFR' column of Table A1 by the adjustment factor in Table A2.

Table A2

Estimation of age-specific and total fertility rates, 2014 Census

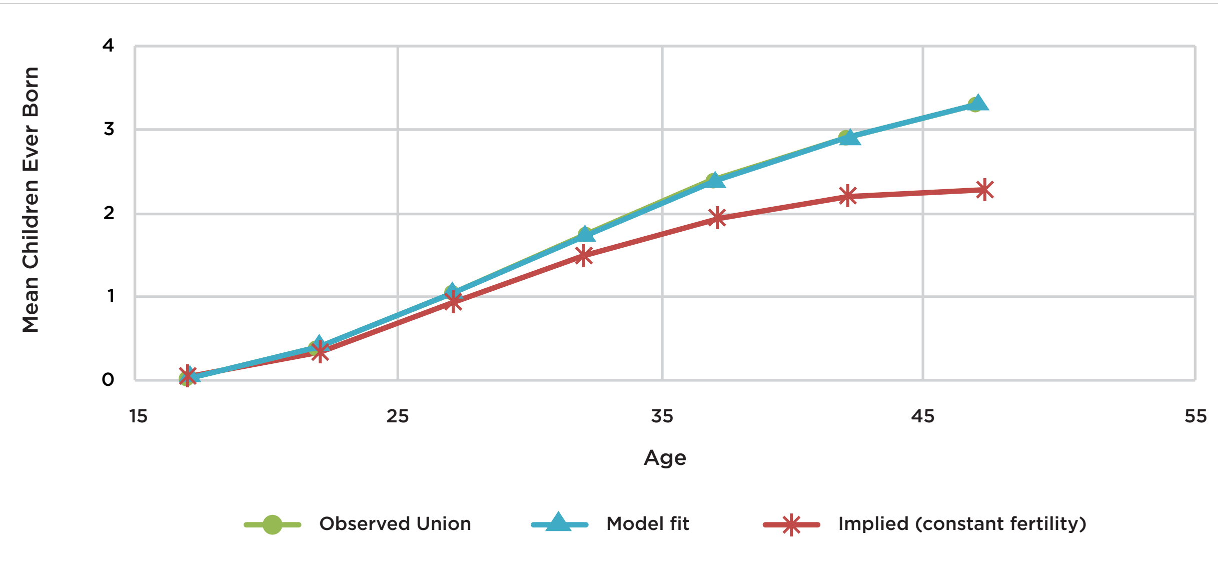
Age	Midpoint	MCEB Observed	MCEB Fitted	Residual	Relative Difference	ASFR Adjusted
15-19	17.5	0.0472	0.0436	0.0036	7.6	0.0332
20-24	22.5	0.4079	0.4036	0.0043	1.1	0.1087
25-29	27.5	1.0419	1.0455	-0.0036	-0.3	0.1292
30-34	32.5	1.7317	1.7275	0.0042	0.2	0.1124
35-39	37.5	2.3694	2.3777	-0.0083	-0.3	0.0765
40-44	42.5	2.9001	2.8919	0.0082	0.3	0.0334
45-49	47.5	3.2698	3.2727	-0.0029	-0.1	0.0075

Sum of squared residuals ×1000	0.2059
Estimated Total Fertility *(TF)*	2.5052
Years of constant fertility before Census *(T)*	5.4645
Rate of fertility decline in prior years *(r)*	0.0660
Unadjusted Total Fertility	2.2880
Adjustment Factor	1.0949

Source: MCEB Observed from Table A1.
Note: The adjustment factor equals total fertility divided by unadjusted total fertility. The estimated age-specific fertility rates equal the unadjusted fertility rates in Table A1 multiplied by the adjustment factor. See text for description of model and fitting procedure.

Figure A1

Mean number of children ever born by age of mother, 2014 Census



Source: Table A2

A5 Implementation

The model was implemented first in Excel with the numerical minimization effected using the SOLVER add-in, then in R (The R Project for Statistical Computing) using the optim function. Comparison of results from the two implementations provides quality assurance for correct implementation.

The spreadsheet approach is useful for producing small numbers of estimates, but clumsy for producing large numbers of estimates. Appendix B, Table B1 presents a total of 503 estimates, one for the Union of Myanmar, 15 for the States and Regions, 74 for the Districts, and 413 for the Townships. The estimates were produced by a suite of R programs written for the purpose.

Estimates of births for subnational areas are calculated 'top-down'. The estimate of births for the Union produced by applying the procedure to Union input data are accepted as final. Estimates for States and Regions are adjusted, if necessary, to conform to the Union total. Similarly, estimates for Districts are adjusted as necessary to conform to the State/Region totals, and estimates for Townships, as necessary, to conform to the District totals.

A6 Variability of births over Townships

Townships vary greatly in size. The adjusted number of births varies from a low of 18 for Cocogyun Township in the South Yangon District of Yangon Region, to a high of 13,124 for Hlinethaya Township in the North Yangon District of Yangon Region. The histogram in Figure A2 shows the extreme variability is due to a small number of very large Townships, but also that great variability remains even if these very large Townships are excluded.

A7 Variability of total fertility and adjustment factors over Townships

Figure A3 plots adjustment factors against total fertility for the 413 Townships. It shows that there is no overall correlation between the two. It also shows that there are four very high adjustment factors, and that these occur for high levels of estimated total fertility, but that they are not responsible for the highest total fertility estimates.

A8 Estimates from the 2001 FRHS

The 2001 Fertility and Reproductive Health Survey included a question on births during the previous 12 months, and data on children ever born is available from the birth history reported on the individual questionnaire. Tables A3 and A4 together with Figure A4 show the results of applying the estimation procedure described above to the survey data.

A9 Estimates from the 2007 FRHS

Similar data was collected in the 2007 Fertility and Reproductive Health Survey. These are presented in Tables A5 and A6 and Figure A5.

Figure A2

Distribution of births among the 413 Townships, 2014 Census

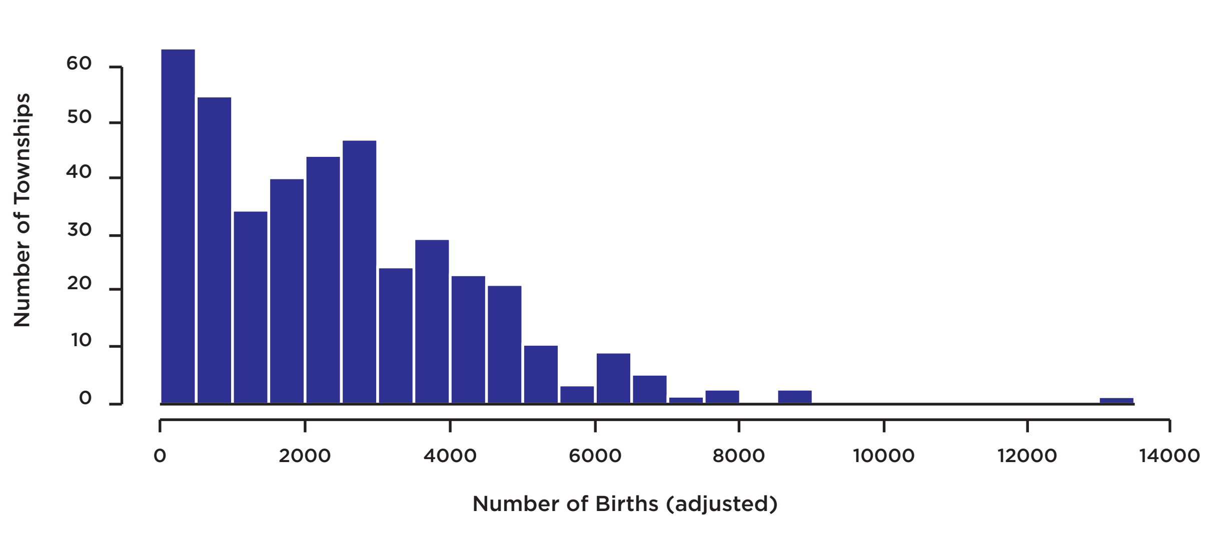


Figure A3

Adjustment factor by estimated total fertility, 413 Townships, 2014 Census

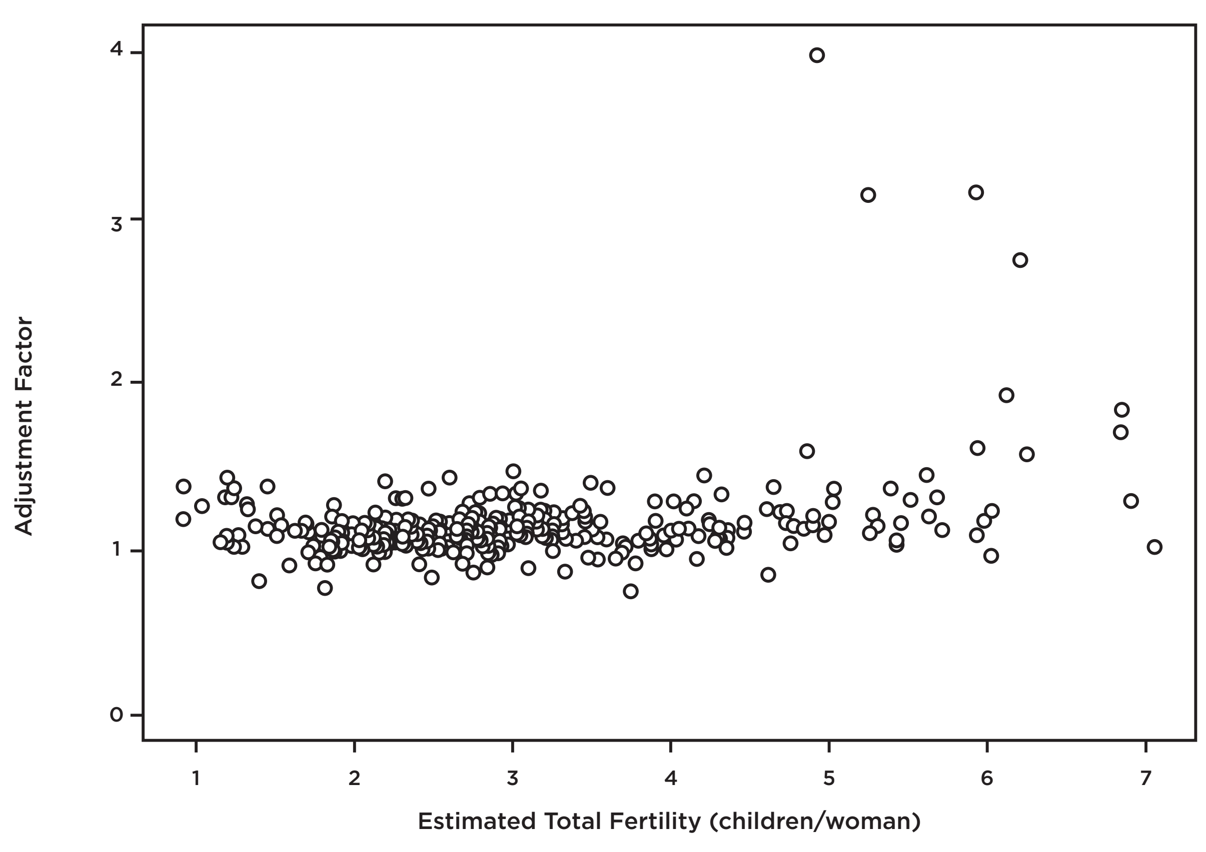


Table A3

Input data and preliminary calculations for estimation of recent fertility, 2001 Fertility and Reproductive Health Survey

Age	Women	CEB	Births	PYL	MCEB (P)	ASFR	Implied MCEB (F)	P/F
15	632	3	2	622	0.0047	0.0032	0.0032	1.5000
16	611	4	4	612	0.0065	0.0065	0.0097	0.6741
17	613	7	4	608	0.0114	0.0065	0.0162	0.7033
18	603	24	14	564	0.0398	0.0232	0.0395	1.0088
19	524	49	23	549	0.0935	0.0439	0.0833	1.1220
20	573	109	37	554	0.1902	0.0646	0.1479	1.2860
21	534	116	33	520	0.2172	0.0618	0.2097	1.0358
22	506	203	49	478	0.4012	0.0968	0.3066	1.3087
23	450	228	46	463	0.5067	0.1022	0.4088	1.2395
24	475	305	63	465	0.6421	0.1326	0.5414	1.1860
25	454	343	49	473	0.7555	0.1079	0.6493	1.1635
26	492	445	55	489	0.9045	0.1118	0.7611	1.1883
27	486	525	65	470	1.0802	0.1337	0.8949	1.2072
28	453	535	65	449	1.1810	0.1435	1.0384	1.1374
29	445	643	63	475	1.4449	0.1416	1.1799	1.2246
30	505	872	72	460	1.7267	0.1426	1.3225	1.3057
31	414	824	55	440	1.9903	0.1329	1.4554	1.3676
32	466	887	54	464	1.9034	0.1159	1.5712	1.2114
33	462	975	50	444	2.1104	0.1082	1.6795	1.2566
34	425	957	47	434	2.2518	0.1106	1.7901	1.2579
35	442	1,142	53	441	2.5837	0.1199	1.9100	1.3528
36	439	1,150	33	426	2.6196	0.0752	1.9851	1.3196
37	412	1,148	38	411	2.7864	0.0922	2.0774	1.3413
38	409	1,154	33	382	2.8215	0.0807	2.1580	1.3074
39	354	1,089	29	375	3.0763	0.0819	2.2400	1.3734
40	396	1,228	15	371	3.1010	0.0379	2.2778	1.3614
41	345	1,127	9	360	3.2667	0.0261	2.3039	1.4179
42	375	1,314	22	363	3.5040	0.0587	2.3626	1.4831
43	350	1,298	13	329	3.7086	0.0371	2.3997	1.5454
44	307	1,092	12	323	3.5570	0.0391	2.4388	1.4585
45	339	1,217	4	328	3.5900	0.0118	2.4506	1.4649
46	317	1,176	1	304	3.7098	0.0032	2.4538	1.5119
47	291	1,122	1	290	3.8557	0.0034	2.4572	1.5691
48	288	1,103	1	251	3.8299	0.0035	2.4607	1.5564
49	213	792	0	213	3.7183	0.0000	2.4607	1.5111
---	---	---	---	---	---	---	---	---
15-19	2,983	87	66	2,954	0.0292	0.0222	0.0286	1.0193
20-24	2,538	961	234	2,479	0.3786	0.0944	0.3124	1.2119
25-29	2,330	2,491	309	2,356	1.0691	0.1310	0.9011	1.1864
30-34	2,272	4,515	269	2,241	1.9872	0.1198	1.5578	1.2757
35-39	2,056	5,683	167	2,033	2.7641	0.0821	2.0657	1.3381
40-44	1,773	6,059	66	1,745	3.4174	0.0375	2.3528	1.4525
45-49	1,448	5,410	5	1,279	3.7362	0.0039	2.4561	1.5212

Source: Special tabulation of 2001 Fertility and Reproductive Health Survey Data.

Note: CEB = children ever born. Births = births to ever-married women during the 12 months prior to the Census. PYL = person-years lived. MCEB = mean children ever born. ASFR = age-specific fertility rate. For Births and ASFRs by single year of age, age refers to age of woman/mother at the time of the Census. For Births and ASFRs for five-year age groups, age refers to age of woman/mother at time of birth.

Table A4

Estimates of age-specific and total fertility rates, 2001 Fertility and Reproductive Health Survey

Age	Midpoint	MCEB Observed	MCEB Fitted	Residual	Relative Difference	ASFR Adjusted
15-19	17.5	0.0292	0.0330	-0.0038	-13.2	0.0252
20-24	22.5	0.3786	0.3686	0.0101	2.7	0.1075
25-29	27.5	1.0691	1.1022	-0.0331	-3.1	0.1491
30-34	32.5	1.9872	1.9877	-0.0005	0.0	0.1364
35-39	37.5	2.7641	2.7751	-0.0110	-0.4	0.0935
40-44	42.5	3.4174	3.3650	0.0524	1.5	0.0427
45-49	47.5	3.7362	3.7659	-0.0297	-0.8	0.0045

Sum of squared residuals ×1000	4.9551
Estimated Total Fertility *(TF)*	2.7944
Years of constant fertility before Census *(T)*	0.0000
Rate of fertility decline in prior years *(r)*	0.0591
Unadjusted Total Fertility	2.4550
Adjustment Factor	1.1383

Source: Table A3

Note: See note to Table A2

Figure A4

Mean number of children ever born by age of mother, 2001 Fertility and Reproductive Health Survey

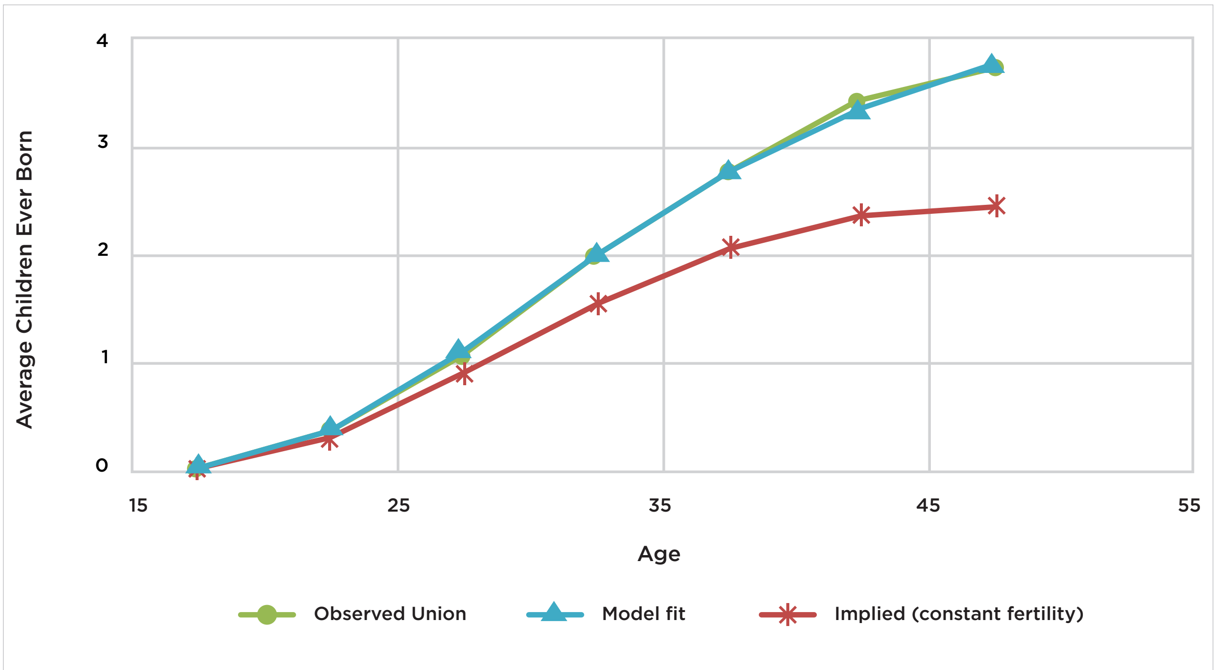


Table A5

Input data and preliminary calculations for estimation of recent fertility, 2007 Fertility and Reproductive Health Survey

Age	Women	CEB	Births	PYL	MCEB (P)	ASFR	Implied MCEB (F)	P/F
15	587	0	0	617	0.0000	0.0000	0.0000	-
16	646	3	3	619	0.0046	0.0046	0.0046	1.0000
17	591	7	4	661	0.0118	0.0068	0.0114	1.0379
18	730	23	13	661	0.0315	0.0178	0.0292	1.0782
19	592	37	19	620	0.0625	0.0321	0.0613	1.0193
20	647	94	38	614	0.1453	0.0587	0.1200	1.2102
21	580	102	38	587	0.1759	0.0655	0.1856	0.9477
22	593	135	34	580	0.2277	0.0573	0.2429	0.9372
23	566	192	40	544	0.3392	0.0707	0.3136	1.0818
24	521	220	47	547	0.4223	0.0902	0.4038	1.0458
25	573	337	65	538	0.5881	0.1134	0.5172	1.1371
26	502	358	51	491	0.7131	0.1016	0.6188	1.1524
27	480	394	45	508	0.8208	0.0938	0.7126	1.1519
28	536	569	66	506	1.0616	0.1231	0.8357	1.2703
29	476	507	51	501	1.0651	0.1071	0.9428	1.1297
30	525	684	70	474	1.3029	0.1333	1.0762	1.2106
31	422	613	51	444	1.4526	0.1209	1.1970	1.2135
32	466	737	52	501	1.5815	0.1116	1.3086	1.2086
33	536	860	56	469	1.6045	0.1045	1.4131	1.1354
34	401	671	37	448	1.6733	0.0923	1.5054	1.1116
35	494	999	45	471	2.0223	0.0911	1.5965	1.2667
36	447	864	33	446	1.9329	0.0738	1.6703	1.1572
37	445	1,044	38	489	2.3461	0.0854	1.7557	1.3363
38	532	1,279	39	485	2.4041	0.0733	1.8290	1.3145
39	438	1,039	26	487	2.3721	0.0594	1.8883	1.2562
40	536	1,394	30	468	2.6007	0.0560	1.9443	1.3376
41	400	1,067	22	411	2.6675	0.0550	1.9993	1.3342
42	422	1,161	16	413	2.7512	0.0379	2.0372	1.3505
43	403	1,111	10	378	2.7568	0.0248	2.0620	1.3369
44	352	1,031	9	381	2.9290	0.0256	2.0876	1.4030
45	410	1,261	6	423	3.0756	0.0146	2.1022	1.4630
46	435	1,304	6	402	2.9977	0.0138	2.1160	1.4167
47	369	1,156	4	386	3.1328	0.0108	2.1269	1.4730
48	402	1,145	1	318	2.8483	0.0025	2.1294	1.3376
49	234	503	0	234	2.1496	0.0000	2.1294	1.0095
---	---	---	---	---	---	---	---	---
15-19	3,146	70	58	3,176	0.0223	0.0183	0.0214	1.0390
20-24	2,907	743	211	2,870	0.2556	0.0733	0.2467	1.0360
25-29	2,567	2,165	281	2,543	0.8434	0.1103	0.7190	1.1730
30-34	2,350	3,565	254	2,335	1.5170	0.1086	1.2941	1.1723
35-39	2,356	5,225	174	2,377	2.2177	0.0730	1.7473	1.2692
40-44	2,113	5,764	75	2,050	2.7279	0.0366	2.0196	1.3507
45-49	1,850	5,369	14	1,645	2.9022	0.0085	2.1197	1.3691

Source: Special tabulation of 2007 Fertility and Reproductive Health Survey.

Note: CEB = children ever born. Births = births to ever-married women during the 12 months prior to the Census. PYL = person-years lived. MCEB = mean children ever born. ASFR = age-specific fertility rate. For Births and ASFRs by single year of age, age refers to age of woman/mother at the time of the Census. For Births and ASFRs for five-year age groups, age refers to age of woman/mother at time of birth.

Table A6

Estimates of age-specific and total fertility rates, 2007 Fertility and Reproductive Health Survey

Age	Midpoint	MCEB Observed	MCEB Fitted	Residual	Relative Difference	ASFR Adjusted
15-19	17.5	0.0223	0.0241	-0.0019	-8.4	0.0202
20-24	22.5	0.2556	0.2830	-0.0274	-10.7	0.0813
25-29	27.5	0.8434	0.8459	-0.0025	-0.3	0.1223
30-34	32.5	1.5170	1.5681	-0.0511	-3.4	0.1204
35-39	37.5	2.2177	2.2015	0.0162	0.7	0.0809
40-44	42.5	2.7279	2.6592	0.0687	2.5	0.0406
45-49	47.5	2.9022	2.9457	-0.0435	-1.5	0.0094

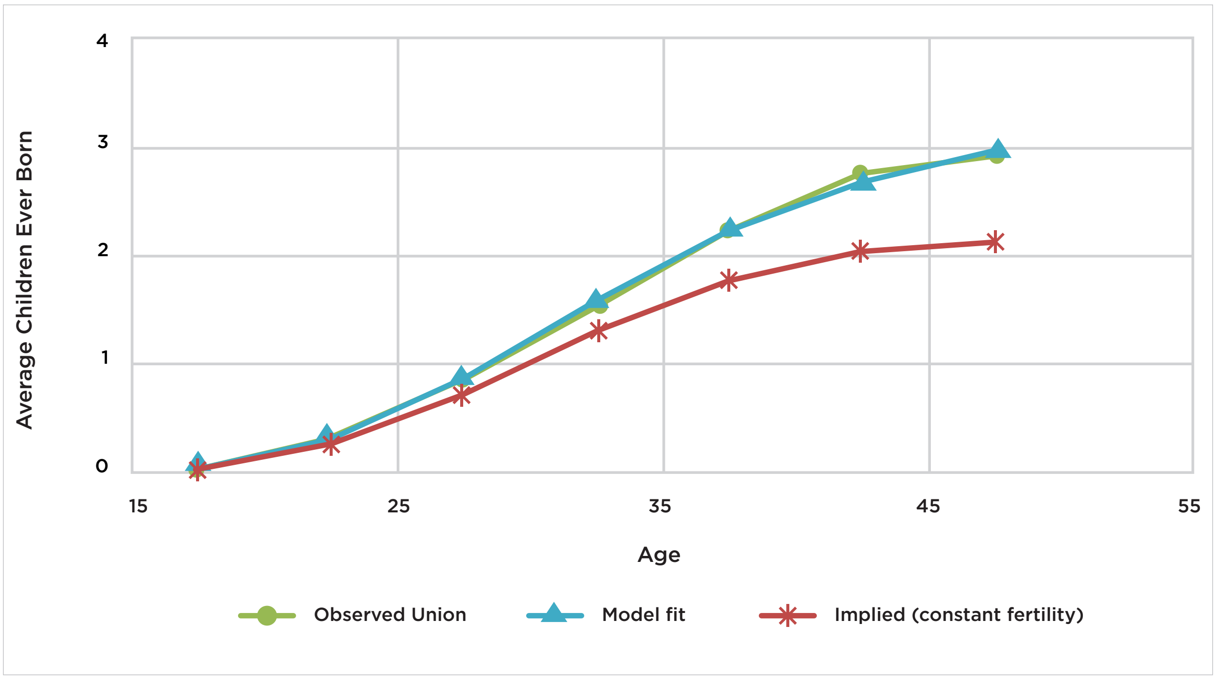
Sum of squared residuals ×1000	10.2419
Estimated Total Fertility *(TF)*	2.3757
Years of constant fertility before Census *(T)*	0.0000
Rate of fertility decline in prior years *(r)*	0.0362
Unadjusted Total Fertility	2.1429
Adjustment Factor	1.1086

Source: Table A5

Note: See note to Table A2

Figure A5

Mean number of children ever born by age of mother, 2007 Fertility and Reproductive Health Survey



Appendix B.
Fertility estimates for Myanmar, States/Regions, Districts and Townships, Myanmar 2014 Census

Table B1 presents estimates down to the Township level calculated by the method described in Appendix A. There were, at the time of the 2014 Census, 15 States and Regions, 74 Districts, and 413 Townships; a total of 502 subnational areas. Consistency between the estimates for these different levels of geography was ensured by the method described in section A5. The accuracy of the estimates is discussed in section 2.7 of Chapter 2.

Numbers of unadjusted births for the Union and States/Regions shown in the table differ slightly from numbers previously published in the Main Report (Department of Population, 2015). The unadjusted numbers are births to females under age 50, whereas the numbers in the Main Report are of births to females of all ages. The Census records show some births to women as old as 56 at the time of the Census. The differences are immaterial because the procedure described in Appendix A adjusts the numbers calculated from the Census information for over- or under-reporting.

Table B1

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Union	-	-	907,162	993,294	1.09	0.0332	0.1087	0.1292	0.1124	0.0765	0.0334	0.0075	2.51
Kachin	-	-	30,288	32,733	1.08	0.0373	0.1346	0.1636	0.1386	0.0902	0.0363	0.0079	3.04
Kachin	Myitkyina	-	10,767	11,608	1.08	0.0341	0.1298	0.1611	0.1437	0.0975	0.0391	0.0080	3.07
Kachin	Myitkyina	Myitkyina	5,589	6,132	1.10	0.0225	0.1061	0.1419	0.1364	0.0918	0.0320	0.0065	2.69
Kachin	Myitkyina	Waingmaw	2,368	2,457	1.04	0.0437	0.1592	0.1858	0.1456	0.0985	0.0421	0.0040	3.39
Kachin	Myitkyina	Ingyanyan	42	71	1.69	0.0617	0.2094	0.3880	0.2389	0.2784	0.1454	0.0505	6.86
Kachin	Myitkyina	Tanaing	1,046	923	0.88	0.0553	0.1400	0.1568	0.1314	0.0908	0.0423	0.0070	3.12
Kachin	Myitkyina	Chiphwe	306	363	1.19	0.0764	0.2573	0.2219	0.2380	0.1572	0.0676	0.0397	5.29
Kachin	Myitkyina	Hsotlaw	217	231	1.06	0.0620	0.2368	0.2723	0.2535	0.1948	0.1261	0.0478	5.97
Kachin	Myitkyina	Hsinbo (Sub-Tsp)	204	244	1.20	0.0518	0.1568	0.1840	0.1331	0.0866	0.0547	0.0075	3.37
Kachin	Myitkyina	Hsadone (Sub-Tsp)	219	346	1.58	0.0470	0.1680	0.2299	0.1944	0.1762	0.1290	0.0311	4.88
Kachin	Myitkyina	Kanpaikti (Sub-Tsp)	219	226	1.03	0.0659	0.1576	0.1612	0.1308	0.0998	0.0628	0.0052	3.42
Kachin	Myitkyina	Shinbwayyan (Sub-Tsp)	339	320	0.94	0.0529	0.1562	0.1854	0.1839	0.1120	0.0247	0.0260	3.71
Kachin	Myitkyina	Panwa (Sub-Tsp)	218	295	1.35	0.0708	0.2781	0.2642	0.1729	0.1149	0.0735	0.0358	5.05
Kachin	Mohnyin	-	10,482	11,232	1.07	0.0341	0.1315	0.1632	0.1329	0.0825	0.0330	0.0069	2.92
Kachin	Mohnyin	Mohnyin	2,992	3,419	1.14	0.0328	0.1299	0.1669	0.1348	0.0844	0.0333	0.0076	2.95
Kachin	Mohnyin	Mogaung	2,649	2,872	1.08	0.0316	0.1360	0.1628	0.1317	0.0819	0.0308	0.0061	2.90
Kachin	Mohnyin	Phakant	3,580	3,675	1.03	0.0386	0.1360	0.1668	0.1377	0.0828	0.0374	0.0086	3.04
Kachin	Mohnyin	Hopin (Sub-Tsp)	787	805	1.02	0.0239	0.0946	0.1231	0.1014	0.0665	0.0224	0.0026	2.17
Kachin	Mohnyin	Kamine (Sub-Tsp)	474	461	0.97	0.0578	0.1772	0.2085	0.1805	0.1250	0.0403	0.0077	3.99
Kachin	Bhamo	-	6,743	6,967	1.03	0.0460	0.1357	0.1505	0.1180	0.0703	0.0266	0.0062	2.77
Kachin	Bhamo	Bhamo	2,463	2,554	1.04	0.0391	0.1211	0.1470	0.1177	0.0670	0.0268	0.0051	2.62
Kachin	Bhamo	Shwegu	1,981	1,870	0.94	0.0478	0.1375	0.1465	0.1161	0.0820	0.0344	0.0067	2.85
Kachin	Bhamo	Momauk	851	846	0.99	0.0454	0.1557	0.1648	0.1303	0.0594	0.0133	0.0066	2.88
Kachin	Bhamo	Mansi	953	1,159	1.22	0.0526	0.1445	0.1547	0.1131	0.0669	0.0221	0.0080	2.81
Kachin	Bhamo	Myohla (Sub-Tsp)	98	104	1.06	0.0927	0.1780	0.1472	0.1258	0.1099	0.0514	0.0053	3.55
Kachin	Bhamo	Lwe'ge' (Sub-Tsp)	153	148	0.97	0.0306	0.1100	0.1238	0.0846	0.0458	0.0196	0.0049	2.10
Kachin	Bhamo	Dotphoneyan (Sub-Tsp)	244	286	1.17	0.0787	0.1987	0.1804	0.1450	0.0767	0.0233	0.0076	3.55
Kachin	Putao	-	2,296	2,926	1.27	0.0396	0.1718	0.2305	0.2357	0.1927	0.0863	0.0226	4.90
Kachin	Putao	Putao	1,680	1,935	1.15	0.0437	0.1769	0.2330	0.2204	0.1744	0.0813	0.0207	4.75
Kachin	Putao	Sumprabum	59	85	1.44	0.0219	0.2192	0.2519	0.2591	0.2072	0.0800	0.0823	5.61
Kachin	Putao	Machanbaw	259	292	1.13	0.0485	0.2030	0.2345	0.2508	0.2500	0.0886	0.0184	5.47
Kachin	Putao	Khaunglanphoo	93	371	3.99	0.0145	0.0813	0.1876	0.2870	0.2313	0.1415	0.0456	4.94

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Kachin	Putao	Naungmoon	133	172	1.29	0.0248	0.2065	0.2655	0.3006	0.2131	0.0811	0.0128	5.52
Kachin	Putao	Pannandin (Sub-Tsp)	72	71	0.99	0.0557	0.1448	0.2768	0.3765	0.3499	0.1849	0.0229	7.06
Kayah	-	-	7,167	7,546	1.05	0.0378	0.1443	0.1857	0.1631	0.1067	0.0511	0.0126	3.51
Kayah	Loikaw	-	6,134	6,415	1.05	0.0352	0.1424	0.1839	0.1619	0.1055	0.0516	0.0123	3.46
Kayah	Loikaw	Loikaw	2,731	2,746	1.01	0.0320	0.1170	0.1489	0.1261	0.0757	0.0334	0.0066	2.70
Kayah	Loikaw	Dimawso	2,305	2,477	1.07	0.0357	0.1621	0.2166	0.2067	0.1341	0.0700	0.0134	4.19
Kayah	Loikaw	Phruso	922	996	1.08	0.0372	0.1982	0.2426	0.2102	0.1876	0.0927	0.0307	5.00
Kayah	Loikaw	Shardaw	176	196	1.11	0.0776	0.1775	0.2316	0.1861	0.0937	0.0617	0.0384	4.33
Kayah	Bawlakhe	-	1,032	1,131	1.09	0.0550	0.1564	0.1967	0.1704	0.1143	0.0480	0.0154	3.78
Kayah	Bawlakhe	Bawlakhe	168	188	1.12	0.0435	0.1410	0.2147	0.1466	0.0610	0.0317	0.0192	3.29
Kayah	Bawlakhe	Parsaung	650	723	1.11	0.0514	0.1608	0.1986	0.1806	0.1372	0.0634	0.0128	4.02
Kayah	Bawlakhe	Meisi	164	171	1.04	0.0812	0.1668	0.1921	0.1844	0.0933	0.0357	0.0222	3.88
Kayah	Bawlakhe	Ywathit (Sub-Tsp)	50	49	0.98	0.0821	0.1386	0.1286	0.1017	0.1058	0.0073	0.0105	2.87
Kayin	-	-	34,749	34,293	0.99	0.0393	0.1373	0.1739	0.1530	0.1094	0.0507	0.0109	3.37
Kayin	Hpa-an	-	17,797	16,958	0.95	0.0349	0.1327	0.1769	0.1581	0.1113	0.0510	0.0106	3.38
Kayin	Hpa-an	Hpa-an	8,266	7,770	0.94	0.0282	0.1105	0.1484	0.1380	0.0977	0.0459	0.0084	2.88
Kayin	Hpa-an	Hlaingbwe	3,763	3,193	0.85	0.0374	0.1380	0.1809	0.1555	0.1063	0.0431	0.0106	3.36
Kayin	Hpa-an	Thandaunggyi	790	865	1.09	0.0303	0.1420	0.2128	0.2031	0.1553	0.0532	0.0149	4.06
Kayin	Hpa-an	Paingkyon (Sub-Tsp)	2,244	2,062	0.92	0.0483	0.1517	0.1867	0.1638	0.1118	0.0555	0.0133	3.65
Kayin	Hpa-an	Shan Ywathit (Sub-Tsp)	632	815	1.29	0.0637	0.2371	0.3013	0.2205	0.1841	0.0949	0.0370	5.69
Kayin	Hpa-an	Leiktho (Sub-Tsp)	1,718	1,764	1.03	0.0439	0.2060	0.2723	0.2578	0.1957	0.0957	0.0142	5.43
Kayin	Hpa-an	Bawgali (Sub-Tsp)	384	489	1.27	0.0447	0.1340	0.2096	0.1876	0.1119	0.0812	0.0153	3.92
Kayin	Pharpon	-	850	951	1.12	0.0405	0.1675	0.2190	0.1727	0.1265	0.0506	0.0137	3.95
Kayin	Pharpon	Pharpon	298	379	1.27	0.0404	0.1635	0.2126	0.1865	0.1291	0.0656	0.0089	4.03
Kayin	Pharpon	Kamamaung (Sub-Tsp)	552	572	1.04	0.0410	0.1697	0.2210	0.1650	0.1244	0.0424	0.0158	3.90
Kayin	Myawady	-	5,027	4,955	0.99	0.0539	0.1364	0.1536	0.1296	0.0889	0.0375	0.0121	3.06
Kayin	Myawady	Myawady	4,541	4,489	0.99	0.0506	0.1289	0.1500	0.1272	0.0879	0.0366	0.0115	2.96
Kayin	Myawady	Sugali (Sub-Tsp)	189	193	1.02	0.0985	0.2706	0.2047	0.1660	0.1150	0.0838	0.0180	4.78
Kayin	Myawady	Wawlaymyaing (Sub-Tsp)	297	273	0.92	0.0909	0.2047	0.2035	0.1777	0.1021	0.0377	0.0223	4.19
Kayin	Kawkareik	-	11,076	11,429	1.03	0.0397	0.1427	0.1764	0.1550	0.1148	0.0560	0.0106	3.48
Kayin	Kawkareik	Kawkareik	4,410	4,283	0.97	0.0304	0.1168	0.1527	0.1338	0.0999	0.0460	0.0080	2.94
Kayin	Kawkareik	Kyarinseikkyi	2,440	2,638	1.08	0.0365	0.1394	0.1797	0.1622	0.1183	0.0522	0.0097	3.49
Kayin	Kawkareik	Payarthonezu (Sub-Tsp)	2,493	2,564	1.03	0.0471	0.1597	0.1833	0.1647	0.1233	0.0682	0.0131	3.80
Kayin	Kawkareik	Kyaidon (Sub-Tsp)	1,733	1,944	1.12	0.0639	0.2038	0.2416	0.2057	0.1533	0.0896	0.0217	4.90

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Chin	-	-	14,116	16,225	1.15	0.0496	0.2048	0.2544	0.2350	0.1623	0.0759	0.0183	5.00
Chin	Hakha	-	2,501	2,788	1.12	0.0554	0.1948	0.2166	0.1894	0.1185	0.0456	0.0100	4.15
Chin	Hakha	Hakha	1,115	1,210	1.09	0.0414	0.1659	0.1875	0.1554	0.1111	0.0393	0.0073	3.54
Chin	Hakha	Thantlang	1,386	1,578	1.14	0.0698	0.2239	0.2477	0.2241	0.1256	0.0526	0.0128	4.78
Chin	Falam	-	4,727	5,331	1.13	0.0452	0.2055	0.2439	0.2217	0.1508	0.0734	0.0150	4.78
Chin	Falam	Falam	1,084	1,156	1.07	0.0607	0.2096	0.2269	0.1865	0.1219	0.0575	0.0106	4.37
Chin	Falam	Tedim	2,415	2,899	1.20	0.0346	0.1955	0.2464	0.2332	0.1736	0.0827	0.0168	4.91
Chin	Falam	Tonzaung	706	710	1.01	0.0570	0.2377	0.2863	0.2647	0.1406	0.0847	0.0180	5.44
Chin	Falam	Rihkhuadal (Sub-Tsp)	178	185	1.04	0.0480	0.1898	0.2016	0.1412	0.1005	0.0317	0.0073	3.60
Chin	Falam	Cikha (Sub-Tsp)	344	381	1.11	0.0497	0.2126	0.2330	0.2395	0.1442	0.0671	0.0187	4.82
Chin	Mindat	-	6,889	8,106	1.18	0.0502	0.2078	0.2778	0.2653	0.1930	0.0937	0.0256	5.57
Chin	Mindat	Mindat	1,355	1,610	1.19	0.0362	0.1964	0.2721	0.2907	0.2093	0.1007	0.0220	5.64
Chin	Mindat	Matupi	1,116	1,288	1.15	0.0422	0.1666	0.2738	0.2718	0.1981	0.0833	0.0243	5.30
Chin	Mindat	Kanpalet	750	869	1.16	0.0588	0.2288	0.3030	0.2999	0.1944	0.1011	0.0145	6.00
Chin	Mindat	Paletwa	2,116	2,429	1.15	0.0501	0.2035	0.2547	0.2192	0.1664	0.0806	0.0283	5.01
Chin	Mindat	Reazu (Sub-Tsp)	376	406	1.08	0.0250	0.1750	0.2584	0.2302	0.1908	0.1025	0.0195	5.01
Chin	Mindat	Sami (Sub-Tsp)	1,176	1,504	1.28	0.0851	0.2809	0.3276	0.3177	0.2206	0.1129	0.0389	6.92
Sagaing	-	-	98,773	104,650	1.06	0.0307	0.1057	0.1284	0.1109	0.0761	0.0322	0.0066	2.45
Sagaing	Sagaing	-	7,488	7,954	1.06	0.0180	0.0756	0.1006	0.0913	0.0642	0.0245	0.0052	1.90
Sagaing	Sagaing	Sagaing	4,596	4,743	1.03	0.0185	0.0783	0.1017	0.0968	0.0640	0.0244	0.0061	1.95
Sagaing	Sagaing	Myinmu	1,453	1,548	1.07	0.0174	0.0675	0.0920	0.0780	0.0597	0.0208	0.0041	1.70
Sagaing	Sagaing	Myaung	1,439	1,663	1.16	0.0172	0.0760	0.1072	0.0887	0.0705	0.0293	0.0037	1.96
Sagaing	Shwebo	-	24,761	26,699	1.08	0.0264	0.0943	0.1160	0.1008	0.0695	0.0291	0.0060	2.21
Sagaing	Shwebo	Shwebo	3,424	3,946	1.15	0.0197	0.0797	0.1027	0.0944	0.0642	0.0261	0.0055	1.96
Sagaing	Shwebo	Khin U	2,458	2,660	1.08	0.0224	0.0833	0.1106	0.0980	0.0736	0.0310	0.0050	2.12
Sagaing	Shwebo	Wetlet	3,086	3,165	1.03	0.0191	0.0805	0.1003	0.0891	0.0590	0.0266	0.0059	1.90
Sagaing	Shwebo	Kambalu	5,530	6,115	1.11	0.0325	0.1044	0.1253	0.1097	0.0742	0.0348	0.0085	2.45
Sagaing	Shwebo	Kyunhla	2,118	2,135	1.01	0.0471	0.1274	0.1261	0.0968	0.0668	0.0280	0.0050	2.49
Sagaing	Shwebo	Ye U	2,021	2,146	1.06	0.0257	0.0930	0.1135	0.1040	0.0688	0.0264	0.0059	2.19
Sagaing	Shwebo	Depayin	2,586	2,811	1.09	0.0277	0.1061	0.1262	0.1150	0.0777	0.0303	0.0067	2.45
Sagaing	Shwebo	Tasei	3,070	3,249	1.06	0.0250	0.0948	0.1304	0.1071	0.0746	0.0304	0.0051	2.34
Sagaing	Shwebo	Kyaukmyaung (Sub-Tsp)	468	472	1.01	0.0163	0.0892	0.0950	0.0709	0.0634	0.0138	0.0010	1.75
Sagaing	Monywa	-	11,712	12,536	1.07	0.0206	0.0778	0.1008	0.0924	0.0641	0.0254	0.0042	1.93
Sagaing	Monywa	Monywa	5,472	6,058	1.11	0.0196	0.0724	0.0985	0.0914	0.0629	0.0255	0.0048	1.88

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Sagaing	Monywa	Butalin	2,054	2,117	1.03	0.0239	0.0919	0.1173	0.0986	0.0657	0.0264	0.0042	2.14
Sagaing	Monywa	Ayartaw	2,542	2,677	1.05	0.0184	0.0829	0.0965	0.0924	0.0701	0.0243	0.0034	1.94
Sagaing	Monywa	Chaung Oo	1,644	1,684	1.02	0.0239	0.0758	0.0976	0.0887	0.0574	0.0256	0.0039	1.86
Sagaing	Katha	-	18,328	18,368	1.00	0.0406	0.1258	0.1434	0.1204	0.0807	0.0341	0.0062	2.76
Sagaing	Katha	Katha	3,666	3,748	1.02	0.0389	0.1233	0.1460	0.1312	0.0930	0.0435	0.0071	2.92
Sagaing	Katha	Indaw	2,446	2,337	0.96	0.0286	0.1085	0.1398	0.1195	0.0759	0.0354	0.0053	2.56
Sagaing	Katha	Tigyaing	2,602	2,726	1.05	0.0391	0.1135	0.1361	0.1242	0.0825	0.0349	0.0092	2.70
Sagaing	Katha	Banmauk	3,008	2,802	0.93	0.0475	0.1718	0.1847	0.1458	0.0988	0.0442	0.0077	3.50
Sagaing	Katha	Kawlin	2,534	2,569	1.01	0.0396	0.1072	0.1126	0.0904	0.0536	0.0200	0.0041	2.14
Sagaing	Katha	Wuntho	1,452	1,399	0.96	0.0409	0.1066	0.1293	0.1153	0.0826	0.0323	0.0048	2.56
Sagaing	Katha	Pinlebu	2,620	2,787	1.06	0.0526	0.1537	0.1639	0.1235	0.0858	0.0314	0.0062	3.09
Sagaing	Kalay	-	10,087	10,799	1.07	0.0374	0.1227	0.1408	0.1152	0.0689	0.0290	0.0050	2.60
Sagaing	Kalay	Kalay	6,946	7,471	1.08	0.0370	0.1242	0.1427	0.1167	0.0689	0.0285	0.0049	2.61
Sagaing	Kalay	Kalewa	1,025	1,080	1.05	0.0363	0.1068	0.1205	0.1136	0.0678	0.0265	0.0045	2.38
Sagaing	Kalay	Mingin	2,116	2,248	1.06	0.0393	0.1261	0.1458	0.1109	0.0695	0.0319	0.0057	2.65
Sagaing	Tamu	-	2,743	2,935	1.07	0.0456	0.1563	0.1871	0.1497	0.0958	0.0409	0.0071	3.41
Sagaing	Tamu	Tamu	1,298	1,362	1.05	0.0343	0.1257	0.1625	0.1281	0.0818	0.0391	0.0067	2.89
Sagaing	Tamu	Myothit (Sub-Tsp)	452	513	1.13	0.0603	0.2145	0.2360	0.1892	0.1419	0.0432	0.0118	4.48
Sagaing	Tamu	Khampat (Sub-Tsp)	993	1,060	1.07	0.0576	0.1832	0.2092	0.1703	0.1024	0.0428	0.0062	3.86
Sagaing	Mawlaik	-	4,184	3,921	0.94	0.0371	0.1355	0.1594	0.1491	0.1037	0.0549	0.0096	3.25
Sagaing	Mawlaik	Mawlaik	1,084	1,033	0.95	0.0392	0.1316	0.1374	0.1083	0.0666	0.0332	0.0100	2.63
Sagaing	Mawlaik	Phaungpyin	3,100	2,888	0.93	0.0362	0.1374	0.1700	0.1695	0.1216	0.0654	0.0094	3.55
Sagaing	Hkamti	-	10,309	11,802	1.14	0.0489	0.1845	0.2446	0.2113	0.1645	0.0786	0.0240	4.78
Sagaing	Hkamti	Hkamti	1,056	1,060	1.00	0.0401	0.1630	0.2073	0.1595	0.1176	0.0437	0.0143	3.73
Sagaing	Hkamti	Homalin	6,437	6,303	0.98	0.0489	0.1691	0.2284	0.1938	0.1498	0.0705	0.0140	4.37
Sagaing	Hkamti	Leshi	296	319	1.08	0.0602	0.1915	0.2598	0.2592	0.1966	0.0709	0.0160	5.27
Sagaing	Hkamti	Lahe	922	1,771	1.92	0.0492	0.2256	0.3029	0.2708	0.2161	0.1015	0.0617	6.14
Sagaing	Hkamti	Nanyun	243	264	1.09	0.0489	0.1808	0.2272	0.1691	0.1074	0.0821	0.0494	4.32
Sagaing	Hkamti	Mobaingluk (Sub-Tsp)	62	51	0.82	0.0453	0.1962	0.2301	0.3055	0.1223	0.0246	0.0000	4.62
Sagaing	Hkamti	Sonemara (Sub-Tsp)	205	223	1.09	0.0297	0.1610	0.2356	0.2692	0.3005	0.1173	0.0330	5.73
Sagaing	Hkamti	Htanparkway (Sub-Tsp)	164	199	1.21	0.0859	0.3002	0.2642	0.2383	0.1747	0.0899	0.0543	6.04
Sagaing	Hkamti	Pansaung (Sub-Tsp)	350	562	1.61	0.0207	0.1956	0.3078	0.2632	0.2346	0.1173	0.0489	5.94
Sagaing	Hkamti	Donhee (Sub-Tsp)	574	1,050	1.83	0.0589	0.2260	0.2745	0.2802	0.2604	0.1802	0.0904	6.85
Sagaing	Yinmarpin	-	9,162	9,636	1.05	0.0246	0.0914	0.1096	0.0974	0.0674	0.0281	0.0063	2.12

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Sagaing	Yinmarpin	Yinmarpin	2,260	2,476	1.10	0.0241	0.0853	0.1040	0.1000	0.0636	0.0262	0.0050	2.04
Sagaing	Yinmarpin	Salingyi	1,916	1,908	1.00	0.0148	0.0750	0.0969	0.0854	0.0661	0.0260	0.0073	1.86
Sagaing	Yinmarpin	Palae	2,604	2,717	1.04	0.0283	0.1002	0.1163	0.0991	0.0716	0.0283	0.0073	2.26
Sagaing	Yinmarpin	Kani	2,382	2,535	1.06	0.0304	0.1043	0.1206	0.1039	0.0672	0.0318	0.0053	2.32
Tanintharyi	-	-	29,687	33,077	1.11	0.0381	0.1380	0.1705	0.1506	0.1071	0.0471	0.0114	3.31
Tanintharyi	Dawei	-	8,910	9,679	1.09	0.0275	0.1154	0.1516	0.1419	0.1007	0.0411	0.0091	2.94
Tanintharyi	Dawei	Dawei	1,970	2,105	1.07	0.0206	0.0850	0.1229	0.1178	0.0765	0.0266	0.0083	2.29
Tanintharyi	Dawei	Lounglon	1,970	2,150	1.09	0.0234	0.1148	0.1487	0.1378	0.1020	0.0380	0.0089	2.87
Tanintharyi	Dawei	Thayetchaung	1,860	2,147	1.15	0.0241	0.1132	0.1586	0.1628	0.1158	0.0523	0.0103	3.19
Tanintharyi	Dawei	Yebyu	2,096	2,143	1.02	0.0332	0.1321	0.1672	0.1532	0.1113	0.0477	0.0078	3.26
Tanintharyi	Dawei	Myitta (Sub-Tsp)	556	597	1.07	0.0500	0.1850	0.2061	0.1630	0.1217	0.0663	0.0145	4.03
Tanintharyi	Dawei	Kaleinaung (Sub-Tsp)	458	537	1.17	0.0568	0.1686	0.1805	0.1522	0.1044	0.0395	0.0126	3.57
Tanintharyi	Myeik	-	15,701	17,404	1.11	0.0378	0.1427	0.1766	0.1532	0.1104	0.0499	0.0126	3.42
Tanintharyi	Myeik	Myeik	5,532	6,168	1.11	0.0242	0.1108	0.1495	0.1336	0.0896	0.0371	0.0091	2.77
Tanintharyi	Myeik	Kyunsu	4,717	5,307	1.13	0.0609	0.1923	0.2130	0.1796	0.1296	0.0602	0.0165	4.26
Tanintharyi	Myeik	Palaw	1,872	2,032	1.09	0.0311	0.1208	0.1666	0.1382	0.1069	0.0438	0.0110	3.09
Tanintharyi	Myeik	Tanintharyi	2,780	2,952	1.06	0.0413	0.1688	0.1941	0.1735	0.1307	0.0671	0.0189	3.97
Tanintharyi	Myeik	Palauk (Sub-Tsp)	800	945	1.18	0.0449	0.1640	0.2164	0.1832	0.1549	0.0736	0.0128	4.25
Tanintharyi	Kawthoung	-	5,075	5,994	1.18	0.0634	0.1672	0.1887	0.1592	0.1101	0.0521	0.0137	3.77
Tanintharyi	Kawthoung	Kawthoung	2,274	2,662	1.17	0.0462	0.1281	0.1622	0.1386	0.0920	0.0471	0.0119	3.13
Tanintharyi	Kawthoung	Bokepyin	1,240	1,517	1.22	0.0781	0.2179	0.2287	0.1825	0.1377	0.0629	0.0185	4.63
Tanintharyi	Kawthoung	Khamaukkyi (Sub-Tsp)	619	675	1.09	0.1002	0.1804	0.1828	0.1651	0.1279	0.0394	0.0178	4.07
Tanintharyi	Kawthoung	Pyigyimandaing (Sub-Tsp)	446	540	1.21	0.0735	0.2459	0.2296	0.1884	0.1184	0.0715	0.0166	4.72
Tanintharyi	Kawthoung	Karathuri (Sub-Tsp)	496	600	1.21	0.0795	0.1991	0.2292	0.2065	0.1384	0.0663	0.0078	4.63
Bago	-	-	84,040	90,574	1.08	0.0280	0.1046	0.1245	0.1058	0.0713	0.0318	0.0062	2.36
Bago	Bago	-	32,678	36,015	1.10	0.0290	0.1144	0.1376	0.1184	0.0815	0.0368	0.0071	2.62
Bago	Bago	Bago	8,092	8,763	1.08	0.0268	0.1001	0.1180	0.1006	0.0696	0.0289	0.0048	2.24
Bago	Bago	Tanatpin	2,715	3,140	1.16	0.0346	0.1312	0.1493	0.1326	0.0800	0.0464	0.0088	2.91
Bago	Bago	Kawa	3,839	4,163	1.08	0.0257	0.1286	0.1486	0.1204	0.0866	0.0423	0.0073	2.80
Bago	Bago	Waw	3,204	3,680	1.15	0.0293	0.1236	0.1483	0.1318	0.0925	0.0423	0.0080	2.88
Bago	Bago	Nyaunglebin	3,596	3,863	1.07	0.0259	0.1008	0.1360	0.1144	0.0732	0.0333	0.0070	2.45
Bago	Bago	Kyauktaga	4,932	5,668	1.15	0.0295	0.1146	0.1459	0.1334	0.0939	0.0409	0.0082	2.83
Bago	Bago	Daik U	3,766	4,080	1.08	0.0279	0.1162	0.1357	0.1120	0.0798	0.0331	0.0073	2.56
Bago	Bago	Shwegyin	2,534	2,658	1.05	0.0421	0.1463	0.1652	0.1443	0.1050	0.0481	0.0128	3.32

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Bago	Toungoo	-	21,997	23,110	1.05	0.0280	0.1119	0.1373	0.1194	0.0823	0.0390	0.0080	2.63
Bago	Toungoo	Toungoo	4,768	4,630	0.97	0.0257	0.0991	0.1171	0.1036	0.0686	0.0330	0.0063	2.27
Bago	Toungoo	Yaedashe	4,358	4,522	1.04	0.0352	0.1254	0.1327	0.1162	0.0766	0.0374	0.0082	2.66
Bago	Toungoo	Kyaukkyi	2,435	2,840	1.17	0.0312	0.1362	0.1859	0.1579	0.1210	0.0544	0.0102	3.48
Bago	Toungoo	Pyu	5,037	5,278	1.05	0.0245	0.1046	0.1438	0.1242	0.0797	0.0374	0.0084	2.61
Bago	Toungoo	Oatwin	3,167	3,413	1.08	0.0264	0.1123	0.1358	0.1179	0.0868	0.0414	0.0079	2.64
Bago	Toungoo	Htantapin	2,232	2,427	1.09	0.0275	0.1084	0.1351	0.1191	0.0911	0.0428	0.0089	2.66
Bago	Pyay	-	12,028	13,111	1.09	0.0234	0.0793	0.0939	0.0792	0.0512	0.0200	0.0042	1.76
Bago	Pyay	Pyay	3,254	3,475	1.07	0.0203	0.0731	0.0954	0.0781	0.0458	0.0164	0.0052	1.67
Bago	Pyay	Paukkhaung	1,968	2,197	1.12	0.0299	0.0887	0.1088	0.0944	0.0568	0.0284	0.0058	2.06
Bago	Pyay	Padaung	2,050	2,036	0.99	0.0306	0.0901	0.0909	0.0739	0.0488	0.0151	0.0034	1.76
Bago	Pyay	Paunde	1,669	1,924	1.15	0.0242	0.0810	0.0878	0.0761	0.0511	0.0210	0.0030	1.72
Bago	Pyay	Thegon	1,520	1,630	1.07	0.0170	0.0665	0.0798	0.0694	0.0486	0.0201	0.0037	1.53
Bago	Pyay	Shwedaung	1,567	1,849	1.18	0.0191	0.0807	0.0999	0.0851	0.0634	0.0242	0.0036	1.88
Bago	Thayawady	-	17,337	18,338	1.06	0.0298	0.1009	0.1168	0.0964	0.0628	0.0276	0.0049	2.20
Bago	Thayawady	Thayawady	2,621	2,751	1.05	0.0342	0.1136	0.1336	0.0983	0.0683	0.0284	0.0048	2.41
Bago	Thayawady	Letpadan	3,508	3,514	1.00	0.0346	0.1196	0.1271	0.1098	0.0781	0.0380	0.0068	2.57
Bago	Thayawady	Minhla	2,036	2,143	1.05	0.0278	0.1063	0.1159	0.1004	0.0647	0.0258	0.0049	2.23
Bago	Thayawady	Okpo	2,128	2,339	1.10	0.0314	0.1072	0.1231	0.1034	0.0704	0.0299	0.0057	2.36
Bago	Thayawady	Zigon	980	1,027	1.05	0.0253	0.0872	0.1077	0.0858	0.0548	0.0240	0.0035	1.94
Bago	Thayawady	Nattalin	2,146	2,705	1.26	0.0265	0.0799	0.1049	0.0881	0.0537	0.0228	0.0049	1.90
Bago	Thayawady	Monyo	2,212	2,226	1.01	0.0304	0.0997	0.1170	0.1005	0.0635	0.0297	0.0050	2.23
Bago	Thayawady	Gyobingauk	1,706	1,633	0.96	0.0219	0.0804	0.0983	0.0800	0.0459	0.0190	0.0026	1.74
Magway	-	-	67,022	74,020	1.10	0.0266	0.0977	0.1193	0.1039	0.0718	0.0318	0.0065	2.29
Magway	Magway	-	21,057	23,650	1.12	0.0237	0.0962	0.1216	0.1077	0.0773	0.0342	0.0071	2.34
Magway	Magway	Magway	4,644	4,958	1.07	0.0229	0.0934	0.1085	0.0920	0.0645	0.0277	0.0064	2.08
Magway	Magway	Yenangyoung	2,093	2,477	1.18	0.0169	0.1004	0.1250	0.1201	0.0746	0.0329	0.0069	2.38
Magway	Magway	Chauk	3,058	3,404	1.11	0.0232	0.0893	0.1189	0.1056	0.0726	0.0260	0.0059	2.21
Magway	Magway	Taungdwingyi	4,420	5,003	1.13	0.0249	0.0969	0.1197	0.1057	0.0751	0.0377	0.0074	2.34
Magway	Magway	Myothit	3,048	3,511	1.15	0.0310	0.1055	0.1356	0.1194	0.0958	0.0477	0.0106	2.73
Magway	Magway	Natmauk	3,794	4,297	1.13	0.0217	0.0947	0.1314	0.1181	0.0911	0.0390	0.0066	2.51
Magway	Minbu	-	11,602	13,082	1.13	0.0268	0.1003	0.1163	0.1032	0.0736	0.0333	0.0073	2.30
Magway	Minbu	Minbu	2,886	3,218	1.12	0.0234	0.0945	0.1144	0.0940	0.0644	0.0288	0.0072	2.13
Magway	Minbu	Pwint Phyu	2,736	3,172	1.16	0.0236	0.1000	0.1175	0.1069	0.0742	0.0290	0.0082	2.30

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Magway	Minbu	Ngape	1,066	1,111	1.04	0.0486	0.1211	0.1411	0.1041	0.0686	0.0341	0.0075	2.63
Magway	Minbu	Salin	3,984	4,660	1.17	0.0252	0.0981	0.1120	0.1063	0.0797	0.0389	0.0071	2.34
Magway	Minbu	Saytottara	930	921	0.99	0.0367	0.1134	0.1123	0.1097	0.0827	0.0377	0.0047	2.49
Magway	Thayet	-	11,807	12,626	1.07	0.0274	0.0920	0.1117	0.0911	0.0578	0.0249	0.0051	2.05
Magway	Thayet	Thayet	1,483	1,623	1.09	0.0257	0.0837	0.0997	0.0810	0.0479	0.0185	0.0037	1.80
Magway	Thayet	Minhla	2,186	2,273	1.04	0.0282	0.0896	0.1087	0.0895	0.0555	0.0257	0.0052	2.01
Magway	Thayet	Mindon	924	874	0.95	0.0381	0.1084	0.1070	0.0737	0.0408	0.0178	0.0029	1.94
Magway	Thayet	Kamma	1,184	1,147	0.97	0.0326	0.0876	0.0992	0.0801	0.0455	0.0212	0.0043	1.85
Magway	Thayet	Aunglan	3,959	4,298	1.09	0.0255	0.0896	0.1151	0.0977	0.0636	0.0268	0.0061	2.12
Magway	Thayet	Sinpaungwe'	2,071	2,411	1.16	0.0229	0.1015	0.1288	0.1049	0.0758	0.0334	0.0065	2.37
Magway	Pakokku	-	18,663	20,709	1.11	0.0272	0.1024	0.1270	0.1144	0.0798	0.0361	0.0071	2.47
Magway	Pakokku	Pakokku	5,014	5,630	1.12	0.0241	0.0929	0.1170	0.1093	0.0788	0.0340	0.0066	2.31
Magway	Pakokku	Yesagyo	3,896	4,111	1.06	0.0197	0.0829	0.1179	0.1070	0.0778	0.0346	0.0065	2.23
Magway	Pakokku	Myaing	4,069	4,792	1.18	0.0281	0.1066	0.1303	0.1217	0.0822	0.0369	0.0070	2.56
Magway	Pakokku	Pauk	3,575	3,726	1.04	0.0350	0.1274	0.1352	0.1129	0.0760	0.0356	0.0071	2.65
Magway	Pakokku	Seikphyu	2,109	2,450	1.16	0.0361	0.1186	0.1526	0.1335	0.0895	0.0459	0.0105	2.93
Magway	Gangaw	-	3,894	3,953	1.02	0.0360	0.0947	0.1060	0.0840	0.0489	0.0199	0.0044	1.97
Magway	Gangaw	Gangaw	2,312	2,267	0.98	0.0393	0.0981	0.1083	0.0813	0.0520	0.0210	0.0046	2.02
Magway	Gangaw	Htilin	636	665	1.05	0.0258	0.0833	0.0918	0.0882	0.0493	0.0233	0.0055	1.84
Magway	Gangaw	Saw	534	570	1.07	0.0342	0.1051	0.1125	0.0860	0.0493	0.0213	0.0042	2.06
Magway	Gangaw	Kyaukhtu (Sub-Tsp)	412	451	1.09	0.0353	0.0800	0.1090	0.0898	0.0344	0.0103	0.0024	1.81
Mandalay	-	-	99,436	108,606	1.09	0.0234	0.0882	0.1122	0.0988	0.0663	0.0285	0.0061	2.12
Mandalay	Mandalay	-	26,787	27,745	1.04	0.0211	0.0763	0.1013	0.0923	0.0575	0.0212	0.0049	1.87
Mandalay	Mandalay	Aungmyetharzan	3,420	3,799	1.11	0.0152	0.0667	0.0915	0.0866	0.0559	0.0159	0.0039	1.68
Mandalay	Mandalay	Chanayetharzan	1,947	2,179	1.12	0.0089	0.0482	0.0848	0.0796	0.0450	0.0120	0.0041	1.41
Mandalay	Mandalay	Mahaaungmye	3,304	3,527	1.07	0.0156	0.0636	0.0948	0.0914	0.0494	0.0173	0.0027	1.67
Mandalay	Mandalay	Chanmyatharzi	4,490	4,571	1.02	0.0211	0.0712	0.0997	0.0892	0.0534	0.0204	0.0050	1.80
Mandalay	Mandalay	Pyigyidagun	4,206	4,539	1.08	0.0240	0.0916	0.1167	0.1074	0.0650	0.0264	0.0059	2.19
Mandalay	Mandalay	Amarapura	4,098	3,697	0.90	0.0239	0.0803	0.0953	0.0808	0.0541	0.0238	0.0053	1.82
Mandalay	Mandalay	Patheingyi	5,322	5,433	1.02	0.0338	0.1044	0.1220	0.1094	0.0774	0.0319	0.0082	2.44
Mandalay	Pyin Oo Lwin	-	18,413	19,784	1.07	0.0320	0.1107	0.1304	0.1150	0.0731	0.0332	0.0067	2.51
Mandalay	Pyin Oo Lwin	Pyin Oo Lwin	4,074	4,055	1.00	0.0244	0.0908	0.1119	0.0925	0.0531	0.0217	0.0047	2.00
Mandalay	Pyin Oo Lwin	Madaya	4,707	5,408	1.15	0.0299	0.1025	0.1276	0.1172	0.0830	0.0369	0.0069	2.52
Mandalay	Pyin Oo Lwin	Sinku	3,118	3,419	1.10	0.0306	0.1091	0.1241	0.1230	0.0844	0.0448	0.0112	2.64

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Mandalay	Pyin Oo Lwin	Mogok	2,904	3,035	1.05	0.0332	0.1294	0.1430	0.1163	0.0570	0.0242	0.0044	2.54
Mandalay	Pyin Oo Lwin	Thabeikkyin	2,858	2,981	1.04	0.0466	0.1408	0.1585	0.1417	0.0967	0.0457	0.0079	3.19
Mandalay	Pyin Oo Lwin	Tagaung (Sub-Tsp)	752	886	1.18	0.0472	0.1403	0.1663	0.1349	0.0954	0.0450	0.0097	3.19
Mandalay	Kyaukse	-	12,947	13,675	1.06	0.0265	0.0955	0.1142	0.0963	0.0652	0.0284	0.0060	2.16
Mandalay	Kyaukse	Kyaukse	4,632	4,911	1.06	0.0299	0.0960	0.1143	0.1000	0.0651	0.0319	0.0068	2.22
Mandalay	Kyaukse	Singaing	2,506	2,497	1.00	0.0271	0.0915	0.1052	0.0861	0.0508	0.0239	0.0052	1.95
Mandalay	Kyaukse	Myitthar	3,391	3,750	1.11	0.0236	0.1011	0.1216	0.0972	0.0737	0.0272	0.0066	2.26
Mandalay	Kyaukse	Tada U	2,418	2,517	1.04	0.0233	0.0906	0.1133	0.0990	0.0693	0.0288	0.0049	2.15
Mandalay	Myingyan	-	16,435	18,400	1.12	0.0178	0.0803	0.1108	0.1000	0.0696	0.0328	0.0065	2.09
Mandalay	Myingyan	Myingyan	4,125	4,584	1.11	0.0180	0.0772	0.1014	0.0917	0.0612	0.0293	0.0050	1.92
Mandalay	Myingyan	Taungtha	3,428	4,002	1.17	0.0188	0.0819	0.1205	0.1097	0.0783	0.0401	0.0070	2.28
Mandalay	Myingyan	Natogyi	2,666	2,987	1.12	0.0157	0.0780	0.1063	0.0947	0.0705	0.0335	0.0073	2.03
Mandalay	Myingyan	Kyaukpadaung	4,192	4,648	1.11	0.0183	0.0829	0.1159	0.1023	0.0677	0.0318	0.0069	2.13
Mandalay	Myingyan	Ngazun	2,024	2,179	1.08	0.0179	0.0825	0.1123	0.1052	0.0773	0.0299	0.0073	2.16
Mandalay	Nyaung U	-	3,818	3,878	1.02	0.0207	0.0728	0.0983	0.0857	0.0615	0.0286	0.0067	1.87
Mandalay	Nyaung U	Nyaung U	3,137	3,151	1.00	0.0216	0.0745	0.0989	0.0866	0.0574	0.0259	0.0059	1.85
Mandalay	Nyaung U	Ngathayauk (Sub-Tsp)	681	727	1.07	0.0168	0.0635	0.0950	0.0818	0.0808	0.0413	0.0107	1.95
Mandalay	Yame'thin	-	7,253	9,729	1.34	0.0233	0.0971	0.1193	0.0982	0.0731	0.0313	0.0072	2.25
Mandalay	Yame'thin	Yame'thin	3,320	4,628	1.39	0.0262	0.1001	0.1211	0.0945	0.0666	0.0272	0.0069	2.21
Mandalay	Yame'thin	Pyawbwe	3,933	5,101	1.30	0.0208	0.0945	0.1180	0.1018	0.0788	0.0348	0.0074	2.28
Mandalay	Meiktila	-	13,782	15,395	1.12	0.0225	0.0896	0.1145	0.0993	0.0712	0.0312	0.0067	2.18
Mandalay	Meiktila	Meiktila	4,569	5,208	1.14	0.0216	0.0882	0.1125	0.0999	0.0678	0.0303	0.0075	2.14
Mandalay	Meiktila	Mahlaing	2,295	2,186	0.95	0.0198	0.0867	0.1132	0.0967	0.0676	0.0285	0.0060	2.09
Mandalay	Meiktila	Thazi	3,498	4,118	1.18	0.0309	0.1060	0.1323	0.1063	0.0843	0.0350	0.0077	2.51
Mandalay	Meiktila	Wundwin	3,420	3,883	1.14	0.0182	0.0796	0.1026	0.0935	0.0670	0.0307	0.0054	1.98
Mon	-	-	35,467	36,736	1.04	0.0274	0.1019	0.1323	0.1178	0.0827	0.0347	0.0071	2.52
Mon	Mawlamyine	-	20,411	20,762	1.02	0.0259	0.0902	0.1223	0.1105	0.0779	0.0317	0.0064	2.33
Mon	Mawlamyine	Mawlamyine	4,088	4,136	1.01	0.0234	0.0772	0.1038	0.0926	0.0562	0.0189	0.0042	1.88
Mon	Mawlamyine	Kyaikemaraw	3,858	3,480	0.90	0.0342	0.1101	0.1416	0.1222	0.0864	0.0380	0.0089	2.71
Mon	Mawlamyine	Chaungzon	1,818	1,990	1.09	0.0151	0.0765	0.1219	0.1159	0.0745	0.0331	0.0064	2.22
Mon	Mawlamyine	Thanbyuzayat	2,750	2,991	1.09	0.0308	0.0946	0.1220	0.1079	0.0875	0.0349	0.0066	2.42
Mon	Mawlamyine	Mudon	2,878	2,917	1.01	0.0168	0.0722	0.1095	0.1096	0.0769	0.0322	0.0061	2.12
Mon	Mawlamyine	Ye	2,751	2,955	1.07	0.0294	0.1052	0.1391	0.1151	0.0875	0.0375	0.0075	2.61
Mon	Mawlamyine	Lamine (Sub-Tsp)	1,832	1,842	1.01	0.0325	0.1151	0.1470	0.1350	0.0971	0.0427	0.0079	2.89

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Mon	Mawlamyine	Khawzar (Sub-Tsp)	436	451	1.03	0.0285	0.0955	0.1310	0.1291	0.1187	0.0346	0.0032	2.70
Mon	Thaton	-	15,056	15,974	1.06	0.0297	0.1206	0.1482	0.1292	0.0900	0.0393	0.0083	2.83
Mon	Thaton	Thaton	4,334	4,344	1.00	0.0274	0.1127	0.1470	0.1259	0.0866	0.0380	0.0086	2.73
Mon	Thaton	Paung	3,543	3,829	1.08	0.0248	0.1104	0.1366	0.1208	0.0804	0.0351	0.0065	2.57
Mon	Thaton	Kyaikto	3,469	3,838	1.11	0.0365	0.1366	0.1548	0.1280	0.0912	0.0381	0.0069	2.96
Mon	Thaton	Bilin	3,710	3,963	1.07	0.0314	0.1263	0.1560	0.1439	0.1040	0.0468	0.0113	3.10
Rakhine	-	-	36,948	45,689	1.24	0.0385	0.1296	0.1404	0.1189	0.0818	0.0347	0.0088	2.76
Rakhine	Sittwe	-	8,772	11,452	1.31	0.0286	0.1149	0.1365	0.1159	0.0811	0.0339	0.0102	2.61
Rakhine	Sittwe	Sittwe	2,350	2,565	1.09	0.0226	0.0856	0.1162	0.0902	0.0628	0.0192	0.0077	2.02
Rakhine	Sittwe	Ponnagyun	2,282	2,938	1.29	0.0259	0.1193	0.1440	0.1292	0.0905	0.0440	0.0106	2.82
Rakhine	Sittwe	Pauktaw	2,500	3,618	1.45	0.0427	0.1465	0.1437	0.1337	0.0870	0.0384	0.0116	3.02
Rakhine	Sittwe	Yathedaung	1,640	2,331	1.42	0.0215	0.1094	0.1426	0.1141	0.0881	0.0392	0.0115	2.63
Rakhine	Myauk U	-	12,422	15,419	1.24	0.0374	0.1317	0.1448	0.1201	0.0857	0.0378	0.0094	2.83
Rakhine	Myauk U	Myauk U	3,612	4,170	1.15	0.0336	0.1251	0.1378	0.1087	0.0791	0.0385	0.0090	2.66
Rakhine	Myauk U	Kyauktaw	3,100	3,618	1.17	0.0258	0.1067	0.1351	0.1129	0.0826	0.0356	0.0088	2.54
Rakhine	Myauk U	Minbya	3,086	4,150	1.34	0.0391	0.1463	0.1544	0.1341	0.0944	0.0360	0.0096	3.07
Rakhine	Myauk U	Myebon	2,624	3,481	1.33	0.0579	0.1587	0.1545	0.1286	0.0877	0.0409	0.0101	3.19
Rakhine	Maungtaw	-	2,141	2,517	1.18	0.0468	0.1622	0.1725	0.1377	0.0946	0.0440	0.0174	3.38
Rakhine	Maungtaw	Maungtaw	827	915	1.11	0.0517	0.1530	0.1563	0.1206	0.0858	0.0419	0.0209	3.15
Rakhine	Maungtaw	Buthidaung	1,246	1,518	1.22	0.0421	0.1635	0.1804	0.1490	0.1027	0.0450	0.0154	3.49
Rakhine	Maungtaw	Taungpyoletwe (Sub-Tsp)	68	84	1.24	0.0699	0.2536	0.2459	0.1581	0.0451	0.0528	0.0000	4.13
Rakhine	Kyaukpyu	-	7,782	9,603	1.23	0.0450	0.1422	0.1458	0.1296	0.0879	0.0354	0.0084	2.97
Rakhine	Kyaukpyu	Kyaukpyu	2,886	3,600	1.25	0.0350	0.1382	0.1457	0.1343	0.0952	0.0418	0.0109	3.01
Rakhine	Kyaukpyu	Mannaung	716	815	1.14	0.0237	0.0983	0.1063	0.0951	0.0615	0.0187	0.0023	2.03
Rakhine	Kyaukpyu	Yanbye	1,522	1,948	1.28	0.0334	0.1240	0.1356	0.1286	0.0825	0.0365	0.0107	2.76
Rakhine	Kyaukpyu	An	2,658	3,240	1.22	0.0728	0.1736	0.1684	0.1415	0.0973	0.0359	0.0072	3.48
Rakhine	Thandwe	-	5,829	6,698	1.15	0.0487	0.1268	0.1223	0.1044	0.0655	0.0277	0.0051	2.50
Rakhine	Thandwe	Thandwe	1,936	2,077	1.07	0.0433	0.1143	0.1060	0.0851	0.0491	0.0190	0.0032	2.10
Rakhine	Thandwe	Taungup	2,027	2,407	1.19	0.0464	0.1291	0.1332	0.1292	0.0789	0.0355	0.0060	2.79
Rakhine	Thandwe	Gwa	694	797	1.15	0.0662	0.1299	0.1223	0.0995	0.0658	0.0231	0.0033	2.55
Rakhine	Thandwe	Maei (Sub-Tsp)	866	1,072	1.24	0.0477	0.1574	0.1553	0.1168	0.0969	0.0478	0.0132	3.18
Rakhine	Thandwe	Kyeintali (Sub-Tsp)	306	345	1.13	0.0601	0.1118	0.0935	0.0834	0.0410	0.0166	0.0033	2.05
Yangon	-	-	108,576	117,020	1.08	0.0208	0.0707	0.0965	0.0918	0.0615	0.0237	0.0047	1.85
Yangon	North Yangon	-	43,166	44,766	1.04	0.0228	0.0759	0.1000	0.0952	0.0667	0.0280	0.0061	1.97

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Yangon	North Yangon	Insein	3,912	4,239	1.08	0.0167	0.0595	0.0879	0.0880	0.0554	0.0182	0.0046	1.65
Yangon	North Yangon	Mingaladon	4,782	4,793	1.00	0.0183	0.0646	0.0919	0.0895	0.0564	0.0237	0.0035	1.74
Yangon	North Yangon	Hmawby	3,924	4,356	1.11	0.0283	0.0999	0.1084	0.0951	0.0739	0.0300	0.0057	2.21
Yangon	North Yangon	Hlegu	4,615	4,838	1.05	0.0307	0.0976	0.1197	0.1130	0.0758	0.0320	0.0067	2.38
Yangon	North Yangon	Taikkyi	5,134	5,095	0.99	0.0351	0.1059	0.1210	0.0982	0.0700	0.0318	0.0056	2.34
Yangon	North Yangon	Htantabin	2,963	2,959	1.00	0.0276	0.0993	0.1228	0.1118	0.0822	0.0417	0.0093	2.47
Yangon	North Yangon	Shwepyitha	5,634	5,362	0.95	0.0224	0.0659	0.0892	0.0816	0.0593	0.0255	0.0072	1.76
Yangon	North Yangon	Hlinethaya	12,202	13,124	1.08	0.0185	0.0671	0.0943	0.0976	0.0706	0.0293	0.0069	1.92
Yangon	East Yangon	-	31,214	33,814	1.08	0.0174	0.0624	0.0891	0.0857	0.0534	0.0183	0.0032	1.65
Yangon	East Yangon	Thingangyun	2,493	2,448	0.98	0.0130	0.0495	0.0700	0.0701	0.0438	0.0151	0.0025	1.32
Yangon	East Yangon	Yankin	752	755	1.00	0.0093	0.0404	0.0691	0.0750	0.0458	0.0117	0.0017	1.26
Yangon	East Yangon	South Okkalapa	1,670	1,791	1.07	0.0092	0.0431	0.0757	0.0764	0.0415	0.0139	0.0025	1.31
Yangon	East Yangon	North Okkalapa	4,262	4,671	1.10	0.0153	0.0588	0.0892	0.0900	0.0542	0.0190	0.0034	1.65
Yangon	East Yangon	Thakayta	2,610	2,880	1.10	0.0126	0.0569	0.0858	0.0797	0.0468	0.0136	0.0042	1.50
Yangon	East Yangon	Dawbon	1,056	1,179	1.12	0.0247	0.0756	0.0875	0.0886	0.0531	0.0183	0.0027	1.75
Yangon	East Yangon	Tamway	1,664	2,040	1.23	0.0083	0.0355	0.0737	0.0840	0.0515	0.0143	0.0021	1.35
Yangon	East Yangon	Pazuntaung	404	520	1.29	0.0070	0.0386	0.0744	0.0784	0.0413	0.0082	0.0010	1.24
Yangon	East Yangon	Botahtaung	396	404	1.02	0.0079	0.0511	0.0757	0.0608	0.0390	0.0064	0.0025	1.22
Yangon	East Yangon	Dagon Myothit (South)	6,150	6,518	1.06	0.0260	0.0818	0.1031	0.1000	0.0644	0.0247	0.0033	2.02
Yangon	East Yangon	Dagon Myothit (North)	2,438	2,746	1.13	0.0136	0.0539	0.0906	0.0826	0.0488	0.0180	0.0030	1.55
Yangon	East Yangon	Dagon Myothit (East)	2,529	2,899	1.15	0.0281	0.0897	0.1073	0.0959	0.0698	0.0261	0.0043	2.11
Yangon	East Yangon	Dagon Myothit (Seikkan)	3,216	3,236	1.01	0.0296	0.0965	0.1181	0.0956	0.0692	0.0286	0.0051	2.21
Yangon	East Yangon	Mingala Taungnyunt	1,574	1,727	1.10	0.0164	0.0556	0.0799	0.0800	0.0485	0.0159	0.0034	1.50
Yangon	South Yangon	-	25,015	27,507	1.10	0.0294	0.1029	0.1233	0.1048	0.0726	0.0313	0.0068	2.36
Yangon	South Yangon	Thanlyin	4,552	4,860	1.07	0.0277	0.0923	0.1138	0.1006	0.0639	0.0278	0.0058	2.16
Yangon	South Yangon	Kyauktan	2,125	2,508	1.18	0.0243	0.0926	0.1221	0.1068	0.0688	0.0259	0.0065	2.23
Yangon	South Yangon	Thongwa	2,688	2,814	1.05	0.0230	0.0996	0.1148	0.0891	0.0672	0.0251	0.0043	2.12
Yangon	South Yangon	Khayan	2,726	3,189	1.17	0.0274	0.1093	0.1323	0.1087	0.0725	0.0350	0.0075	2.46
Yangon	South Yangon	Twantay	4,408	4,908	1.11	0.0294	0.1120	0.1384	0.1200	0.0890	0.0409	0.0101	2.70
Yangon	South Yangon	Kawhmu	2,058	2,132	1.04	0.0306	0.1051	0.1149	0.1004	0.0674	0.0333	0.0084	2.30
Yangon	South Yangon	Kungyangon	1,937	2,297	1.19	0.0341	0.1065	0.1396	0.1119	0.0792	0.0337	0.0081	2.56
Yangon	South Yangon	Dala	3,335	3,492	1.05	0.0363	0.1063	0.1184	0.1048	0.0721	0.0317	0.0059	2.38
Yangon	South Yangon	Seikkyi/ Khanaungto	656	673	1.03	0.0385	0.1156	0.1204	0.0993	0.0870	0.0275	0.0036	2.46
Yangon	South Yangon	Cocogyun	24	18	0.75	0.1136	0.1262	0.0796	0.0278	0.0223	0.0000	0.0000	1.85

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Yangon	South Yangon	Tada (Sub-Tsp)	506	616	1.22	0.0278	0.0983	0.1150	0.0955	0.0713	0.0229	0.0011	2.16
Yangon	West Yangon	-	9,181	10,933	1.19	0.0110	0.0360	0.0683	0.0802	0.0518	0.0161	0.0028	1.33
Yangon	West Yangon	Kyauktada	211	288	1.36	0.0045	0.0275	0.0690	0.0934	0.0508	0.0082	0.0012	1.27
Yangon	West Yangon	Pabedan	310	423	1.36	0.0143	0.0520	0.0865	0.0846	0.0411	0.0127	0.0023	1.47
Yangon	West Yangon	Lanmadaw	227	313	1.38	0.0033	0.0134	0.0472	0.0698	0.0391	0.0148	0.0013	0.94
Yangon	West Yangon	Latha	123	143	1.16	0.0055	0.0199	0.0451	0.0603	0.0424	0.0079	0.0053	0.93
Yangon	West Yangon	Ahlon	490	615	1.26	0.0127	0.0326	0.0669	0.0863	0.0484	0.0171	0.0013	1.33
Yangon	West Yangon	Kyimyindine	1,609	1,750	1.09	0.0252	0.0626	0.0880	0.0880	0.0613	0.0239	0.0031	1.76
Yangon	West Yangon	Sangyoung	748	924	1.24	0.0093	0.0257	0.0524	0.0715	0.0397	0.0154	0.0025	1.08
Yangon	West Yangon	Hline	1,640	1,694	1.03	0.0091	0.0325	0.0625	0.0701	0.0473	0.0149	0.0025	1.19
Yangon	West Yangon	Kamayut	644	921	1.43	0.0047	0.0231	0.0574	0.0855	0.0585	0.0118	0.0037	1.22
Yangon	West Yangon	Mayangon	2,204	2,659	1.21	0.0109	0.0437	0.0821	0.0879	0.0611	0.0184	0.0035	1.54
Yangon	West Yangon	Dagon	216	232	1.07	0.0078	0.0355	0.0660	0.0735	0.0451	0.0162	0.0006	1.22
Yangon	West Yangon	Bahan	721	932	1.29	0.0075	0.0279	0.0609	0.0827	0.0499	0.0118	0.0035	1.22
Yangon	West Yangon	Seikkan	38	39	1.03	0.0250	0.0812	0.0786	0.0883	0.1051	0.0592	0.0000	2.19
Shan	-	-	117,487	135,328	1.15	0.0588	0.1535	0.1539	0.1213	0.0781	0.0356	0.0122	3.07
Shan	Taunggyi	-	34,923	37,509	1.07	0.0468	0.1361	0.1403	0.1102	0.0708	0.0328	0.0080	2.72
Shan	Taunggyi	Taunggyi	6,480	6,937	1.07	0.0345	0.1046	0.1194	0.1002	0.0555	0.0216	0.0047	2.20
Shan	Taunggyi	Nyaungshwe	3,251	3,697	1.14	0.0485	0.1287	0.1237	0.0945	0.0569	0.0242	0.0076	2.42
Shan	Taunggyi	Hopon	2,448	2,582	1.05	0.0643	0.1578	0.1451	0.1080	0.0714	0.0321	0.0089	2.94
Shan	Taunggyi	Hsihseng	4,420	4,496	1.02	0.0751	0.2015	0.1774	0.1350	0.0950	0.0481	0.0117	3.72
Shan	Taunggyi	Kalaw	3,438	4,150	1.21	0.0393	0.1241	0.1368	0.1192	0.0731	0.0365	0.0094	2.69
Shan	Taunggyi	Pindaya	1,512	1,546	1.02	0.0323	0.1096	0.1230	0.0983	0.0707	0.0399	0.0052	2.40
Shan	Taunggyi	Ywarngan	1,524	1,458	0.96	0.0361	0.1049	0.1112	0.0919	0.0703	0.0301	0.0068	2.26
Shan	Taunggyi	Yatsauk	2,530	2,504	0.99	0.0527	0.1239	0.1292	0.0937	0.0615	0.0294	0.0058	2.48
Shan	Taunggyi	Pinlaung	2,563	2,687	1.05	0.0399	0.1459	0.1482	0.1209	0.0700	0.0347	0.0115	2.86
Shan	Taunggyi	Phekon	2,990	3,140	1.05	0.0373	0.1719	0.2207	0.1688	0.1338	0.0638	0.0161	4.06
Shan	Taunggyi	Kyauktalongyi (Sub-Tsp)	1,212	1,397	1.15	0.0635	0.1753	0.1552	0.0995	0.0603	0.0300	0.0048	2.94
Shan	Taunggyi	Indaw (Sub-Tsp)	859	949	1.10	0.0780	0.1452	0.1426	0.1167	0.0739	0.0346	0.0129	3.02
Shan	Taunggyi	Naungtayar (Sub-Tsp)	1,696	1,966	1.16	0.0468	0.1546	0.1548	0.1186	0.0875	0.0467	0.0111	3.10
Shan	Loilin	-	10,974	12,940	1.18	0.0667	0.1496	0.1410	0.1133	0.0751	0.0360	0.0123	2.97
Shan	Loilin	Loilin	1,141	1,142	1.00	0.0605	0.1475	0.1392	0.1088	0.0697	0.0378	0.0111	2.87
Shan	Loilin	Le'char	790	899	1.14	0.0487	0.1152	0.1125	0.0826	0.0602	0.0243	0.0086	2.26
Shan	Loilin	Nanhsam (South)	1,828	2,180	1.19	0.0638	0.1498	0.1453	0.1245	0.0735	0.0303	0.0130	3.00

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Shan	Loilin	Kunhing	391	447	1.14	0.0548	0.1500	0.1324	0.1033	0.0740	0.0275	0.0103	2.76
Shan	Loilin	Kehsi	762	1,005	1.32	0.0674	0.1431	0.1487	0.1092	0.0689	0.0357	0.0186	2.96
Shan	Loilin	Mongkai	1,658	1,935	1.17	0.0865	0.1693	0.1530	0.1264	0.0929	0.0505	0.0167	3.48
Shan	Loilin	Mineshu	775	1,026	1.32	0.0622	0.1517	0.1474	0.1258	0.0788	0.0309	0.0090	3.03
Shan	Loilin	Panglong (Sub-Tsp)	1,571	1,717	1.09	0.0727	0.1570	0.1525	0.1174	0.0724	0.0401	0.0068	3.09
Shan	Loilin	Kholan (Sub-Tsp)	566	606	1.07	0.0845	0.1659	0.1494	0.1302	0.0895	0.0377	0.0127	3.35
Shan	Loilin	Karli (Sub-Tsp)	386	618	1.60	0.0577	0.1148	0.1143	0.0797	0.0689	0.0250	0.0100	2.35
Shan	Loilin	Minenaung (Sub-Tsp)	560	697	1.24	0.0763	0.1644	0.1373	0.1075	0.0746	0.0462	0.0185	3.12
Shan	Loilin	Minesan (Monsan) (Sub-Tsp)	546	668	1.22	0.0570	0.1584	0.1449	0.1253	0.0814	0.0379	0.0126	3.09
Shan	Linkhe'	-	2,811	2,855	1.02	0.0656	0.1446	0.1344	0.1092	0.0708	0.0313	0.0107	2.83
Shan	Linkhe'	Linkhe'	412	327	0.79	0.0379	0.0718	0.0666	0.0662	0.0245	0.0103	0.0043	1.41
Shan	Linkhe'	Mone'	589	613	1.04	0.0575	0.1591	0.1560	0.1159	0.0644	0.0338	0.0125	3.00
Shan	Linkhe'	Maukme'	1,027	1,069	1.04	0.0930	0.2156	0.1916	0.1590	0.1178	0.0681	0.0218	4.33
Shan	Linkhe'	Minepan	477	502	1.05	0.0577	0.1295	0.1203	0.1028	0.0793	0.0286	0.0071	2.63
Shan	Linkhe'	Homane (Sub-Tsp)	122	142	1.16	0.0732	0.1137	0.1408	0.0850	0.1084	0.0236	0.0064	2.76
Shan	Linkhe'	Kengtaung (Sub-Tsp)	184	202	1.10	0.0608	0.1377	0.1438	0.1026	0.0603	0.0158	0.0107	2.66
Shan	Lashio	-	12,224	13,474	1.10	0.0537	0.1445	0.1505	0.1171	0.0700	0.0286	0.0087	2.87
Shan	Lashio	Lashio	6,368	6,335	0.99	0.0448	0.1254	0.1407	0.1054	0.0644	0.0239	0.0064	2.55
Shan	Lashio	Theinni	1,164	1,161	1.00	0.0613	0.1521	0.1605	0.1245	0.0689	0.0229	0.0047	2.98
Shan	Lashio	Mineye'	1,074	1,423	1.32	0.0628	0.1494	0.1360	0.1134	0.0688	0.0358	0.0123	2.89
Shan	Lashio	Tantyan	3,618	4,555	1.26	0.0663	0.1779	0.1676	0.1360	0.0810	0.0381	0.0145	3.41
Shan	Muse	-	9,685	9,438	0.97	0.0508	0.1497	0.1520	0.1114	0.0655	0.0267	0.0088	2.83
Shan	Muse	Muse	2,233	1,990	0.89	0.0385	0.1143	0.1155	0.0909	0.0478	0.0173	0.0036	2.14
Shan	Muse	Namkham	2,201	2,266	1.03	0.0510	0.1464	0.1494	0.0954	0.0584	0.0211	0.0100	2.66
Shan	Muse	Kukai	2,213	2,321	1.05	0.0540	0.1694	0.1821	0.1447	0.0893	0.0359	0.0102	3.43
Shan	Muse	Monekoe (Sub-Tsp)	578	485	0.84	0.0688	0.1587	0.1391	0.0966	0.0513	0.0303	0.0086	2.77
Shan	Muse	Manhero (Manhyo) (Sub Tsp)	110	99	0.90	0.0754	0.1169	0.0867	0.0538	0.0188	0.0036	0.0000	1.78
Shan	Muse	Pansai (Kyu Kok) (Sub-Tsp)	537	434	0.81	0.0659	0.1429	0.1349	0.0949	0.0469	0.0113	0.0031	2.50
Shan	Muse	Tamoenye (Sub-Tsp)	1,813	1,843	1.02	0.0484	0.1956	0.2089	0.1531	0.1023	0.0497	0.0180	3.88
Shan	Kyaukme	-	16,155	16,307	1.01	0.0490	0.1405	0.1438	0.1138	0.0738	0.0296	0.0088	2.80
Shan	Kyaukme	Kyaukme	2,364	2,306	0.98	0.0410	0.1191	0.1293	0.0957	0.0623	0.0232	0.0053	2.38
Shan	Kyaukme	Naungkhio	2,935	2,902	0.99	0.0404	0.1243	0.1230	0.1033	0.0692	0.0290	0.0062	2.48
Shan	Kyaukme	Hsipaw	3,546	3,914	1.10	0.0600	0.1469	0.1341	0.1049	0.0657	0.0272	0.0085	2.74
Shan	Kyaukme	Namtu	1,140	1,073	0.94	0.0583	0.1568	0.1461	0.1082	0.0796	0.0283	0.0081	2.93

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Shan	Kyaukme	Namsan (North)	1,774	1,678	0.95	0.0405	0.1668	0.1700	0.1375	0.0940	0.0352	0.0128	3.28
Shan	Kyaukme	Momeik	1,293	1,256	0.97	0.0468	0.1322	0.1505	0.1184	0.0648	0.0259	0.0078	2.73
Shan	Kyaukme	Mabane	918	819	0.89	0.0504	0.1096	0.1316	0.1024	0.0584	0.0221	0.0097	2.42
Shan	Kyaukme	Manton	1,156	1,326	1.15	0.0587	0.2138	0.2419	0.2086	0.1379	0.0636	0.0265	4.75
Shan	Kyaukme	Minengaw (Sub-Tsp)	496	452	0.91	0.0519	0.1693	0.2026	0.1551	0.1133	0.0533	0.0129	3.79
Shan	Kyaukme	Minelon (Sub-Tsp)	533	581	1.09	0.0542	0.1493	0.1582	0.1348	0.0803	0.0343	0.0108	3.11
Shan	Kunlon	-	1,452	1,489	1.03	0.0842	0.2274	0.2153	0.1756	0.0940	0.0484	0.0130	4.29
Shan	Kunlon	Kunlon	1,452	1,489	1.03	0.0842	0.2274	0.2153	0.1756	0.0940	0.0484	0.0130	4.29
Shan	Laukine	-	2,851	3,511	1.23	0.0565	0.1869	0.1692	0.1256	0.0855	0.0390	0.0149	3.39
Shan	Laukine	Laukine	1,641	1,957	1.19	0.0580	0.1896	0.1677	0.1234	0.0790	0.0272	0.0135	3.29
Shan	Laukine	Kongyan	728	984	1.35	0.0649	0.2154	0.2287	0.1829	0.1401	0.0716	0.0265	4.65
Shan	Laukine	Chinshwehaw (Sub-Tsp)	121	105	0.87	0.0516	0.1665	0.1572	0.1053	0.0689	0.0203	0.0000	2.85
Shan	Laukine	Mawhtike (Sub-Tsp)	361	465	1.29	0.0440	0.1523	0.0975	0.0678	0.0496	0.0444	0.0084	2.32
Shan	Hopan	-	3,382	7,794	2.30	0.0695	0.2104	0.2276	0.1890	0.1401	0.0897	0.0595	4.93
Shan	Hopan	Hopan	1,184	1,354	1.14	0.0734	0.1592	0.1646	0.1174	0.0847	0.0456	0.0207	3.33
Shan	Hopan	Minemaw	804	2,520	3.13	0.0638	0.2157	0.2427	0.2010	0.1741	0.0945	0.0594	5.26
Shan	Hopan	Panwine	1,194	3,776	3.16	0.0552	0.2192	0.2564	0.2302	0.1752	0.1361	0.1155	5.94
Shan	Hopan	Panlon (Sub-Tsp)	200	144	0.72	0.0802	0.2022	0.1713	0.1703	0.0704	0.0410	0.0144	3.75
Shan	Makman	-	4,798	8,407	1.75	0.0909	0.2216	0.2270	0.1905	0.1385	0.0821	0.0535	5.02
Shan	Makman	Makman	564	688	1.22	0.1512	0.2434	0.2053	0.1857	0.0898	0.0484	0.0235	4.74
Shan	Makman	Pan San (Pan Kham)	2,416	2,777	1.15	0.0833	0.2014	0.1840	0.1300	0.1062	0.0506	0.0286	3.92
Shan	Makman	Naphang	1,778	4,880	2.74	0.0689	0.2103	0.2687	0.2683	0.1855	0.1376	0.1045	6.22
Shan	Makman	ManKan (Sub-Tsp)	40	62	1.55	0.1470	0.2662	0.3010	0.1814	0.2056	0.1512	0.0000	6.26
Shan	Kengtung	-	6,525	8,228	1.26	0.0725	0.1586	0.1525	0.1205	0.0782	0.0407	0.0162	3.20
Shan	Kengtung	Kengtung	3,147	3,801	1.21	0.0671	0.1622	0.1604	0.1271	0.0802	0.0407	0.0137	3.26
Shan	Kengtung	Minekat	888	1,208	1.36	0.1047	0.1646	0.1675	0.1311	0.0843	0.0522	0.0208	3.63
Shan	Kengtung	Mineyan	952	1,118	1.17	0.0671	0.1491	0.1264	0.1036	0.0591	0.0320	0.0136	2.75
Shan	Kengtung	Minelar	432	580	1.34	0.0649	0.1431	0.1240	0.0821	0.0476	0.0259	0.0123	2.50
Shan	Kengtung	MinePauk (Sub-Tsp)	1,106	1,521	1.38	0.0730	0.1615	0.1622	0.1217	0.1035	0.0497	0.0283	3.50
Shan	Minesat	-	6,117	7,635	1.25	0.1175	0.2221	0.2111	0.1717	0.1215	0.0608	0.0297	4.67
Shan	Minesat	Minesat	2,294	2,909	1.27	0.1051	0.2441	0.2408	0.1841	0.1337	0.0643	0.0350	5.04
Shan	Minesat	Minepyin	1,144	1,633	1.43	0.1193	0.2018	0.1810	0.1683	0.1086	0.0489	0.0175	4.23
Shan	Minesat	Minetung	562	625	1.11	0.1335	0.1826	0.1822	0.1431	0.1015	0.0584	0.0259	4.14
Shan	Minesat	Minekoke (Sub-Tsp)	464	633	1.36	0.1718	0.2534	0.2063	0.1707	0.1508	0.0815	0.0444	5.39

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Shan	Minesat	Tontar (Sub-Tsp)	316	411	1.30	0.1384	0.2022	0.1999	0.1312	0.1121	0.0571	0.0300	4.35
Shan	Minesat	Ponparkyin (Sub-Tsp)	1,160	1,260	1.09	0.1015	0.2148	0.2074	0.1748	0.1107	0.0611	0.0284	4.49
Shan	Minesat	Monehta (Sub-Tsp)	177	164	0.93	0.1667	0.2527	0.2227	0.2153	0.1749	0.0978	0.0753	6.03
Shan	Tachileik	-	3,420	3,502	1.02	0.0571	0.1234	0.1266	0.1003	0.0601	0.0215	0.0100	2.49
Shan	Tachileik	Tachileik	2,894	2,873	0.99	0.0496	0.1157	0.1239	0.0985	0.0568	0.0203	0.0094	2.37
Shan	Tachileik	Talay (Sub-Tsp)	334	405	1.21	0.0888	0.1803	0.1578	0.1157	0.0932	0.0349	0.0138	3.42
Shan	Tachileik	Kenglat (Sub-Tsp)	192	224	1.17	0.1391	0.1680	0.1093	0.0922	0.0589	0.0184	0.0134	3.00
Shan	Minephyat	-	2,168	2,239	1.03	0.0903	0.1682	0.1288	0.0937	0.0586	0.0297	0.0125	2.91
Shan	Minephyat	Minephyat	758	739	0.97	0.1252	0.1843	0.1648	0.1415	0.0903	0.0464	0.0236	3.88
Shan	Minephyat	Mineyaung	458	464	1.01	0.0689	0.1458	0.1137	0.0813	0.0515	0.0231	0.0055	2.45
Shan	Minephyat	Mineyu (Sub-Tsp)	952	1,036	1.09	0.0814	0.1739	0.1204	0.0716	0.0449	0.0214	0.0110	2.62
Ayeyawady	-	-	123,255	134,084	1.09	0.0397	0.1263	0.1397	0.1215	0.0855	0.0407	0.0085	2.81
Ayeyawady	Pathein	-	31,237	33,142	1.06	0.0384	0.1176	0.1336	0.1166	0.0795	0.0358	0.0069	2.64
Ayeyawady	Pathein	Kangyidaunt	3,720	3,848	1.03	0.0307	0.1169	0.1352	0.1268	0.0843	0.0467	0.0074	2.74
Ayeyawady	Pathein	Kyaungon	3,230	3,433	1.06	0.0357	0.1152	0.1334	0.1208	0.0843	0.0352	0.0075	2.66
Ayeyawady	Pathein	Kyonpyaw	4,821	5,088	1.06	0.0318	0.1222	0.1451	0.1284	0.0915	0.0411	0.0082	2.84
Ayeyawady	Pathein	Ngaputaw	3,604	3,904	1.08	0.0448	0.1395	0.1548	0.1271	0.0939	0.0402	0.0091	3.05
Ayeyawady	Pathein	Pathein	4,598	4,919	1.07	0.0297	0.0893	0.1080	0.0989	0.0647	0.0277	0.0045	2.11
Ayeyawady	Pathein	Yekyi	1,849	1,951	1.06	0.0323	0.1080	0.1265	0.1022	0.0706	0.0357	0.0068	2.41
Ayeyawady	Pathein	Thapaung	3,205	3,388	1.06	0.0442	0.1265	0.1447	0.1281	0.0877	0.0417	0.0090	2.91
Ayeyawady	Pathein	Ngayokaung (Sub-Tsp)	764	756	0.99	0.0716	0.1282	0.1174	0.1004	0.0608	0.0220	0.0012	2.51
Ayeyawady	Pathein	Hainggyikyun (Sub-Tsp)	2,058	2,316	1.13	0.0485	0.1333	0.1438	0.1128	0.0720	0.0276	0.0058	2.72
Ayeyawady	Pathein	Shwethaungyan (Sub-Tsp)	844	949	1.12	0.0665	0.1335	0.1399	0.1171	0.0651	0.0342	0.0094	2.83
Ayeyawady	Pathein	Ngwehsaung (Sub-Tsp)	865	885	1.02	0.0467	0.1439	0.1438	0.1200	0.0945	0.0317	0.0072	2.94
Ayeyawady	Pathein	Ngathaingchaung (Sub-Tsp)	1,679	1,705	1.02	0.0485	0.1220	0.1263	0.1035	0.0669	0.0320	0.0050	2.52
Ayeyawady	Phyapon	-	21,661	25,432	1.17	0.0472	0.1471	0.1622	0.1358	0.0925	0.0467	0.0108	3.21
Ayeyawady	Phyapon	Kyaiklatt	3,967	4,550	1.15	0.0418	0.1378	0.1684	0.1376	0.0964	0.0465	0.0112	3.20
Ayeyawady	Phyapon	Daydaye	3,554	4,093	1.15	0.0360	0.1268	0.1362	0.1102	0.0747	0.0357	0.0084	2.64
Ayeyawady	Phyapon	Phyapon	3,520	4,099	1.16	0.0331	0.1246	0.1446	0.1243	0.0807	0.0379	0.0099	2.78
Ayeyawady	Phyapon	Bogale	7,484	8,723	1.17	0.0540	0.1582	0.1735	0.1428	0.1008	0.0541	0.0118	3.48
Ayeyawady	Phyapon	Ahmar (Sub-Tsp)	3,136	3,967	1.26	0.0752	0.1929	0.1912	0.1776	0.1164	0.0632	0.0135	4.15
Ayeyawady	Maubin	-	19,406	20,817	1.07	0.0362	0.1231	0.1363	0.1181	0.0869	0.0424	0.0102	2.76
Ayeyawady	Maubin	Nyaungdon	4,386	4,282	0.98	0.0400	0.1195	0.1231	0.1020	0.0768	0.0408	0.0076	2.55
Ayeyawady	Maubin	Danubyu	3,298	3,395	1.03	0.0339	0.1112	0.1286	0.1039	0.0734	0.0332	0.0087	2.46

[a] Adjustment factor (rounded)

Table B1 (continued)

Fertility estimates for States/Regions, Districts, and Townships, Myanmar 2014 Census

State/Region	District	Township	Number of Births		Factor[a]	Age-specific fertility rates							
			Unadjusted	Adjusted		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TF
Ayeyawady	Maubin	Pantanaw	5,547	6,342	1.14	0.0348	0.1234	0.1485	0.1347	0.0984	0.0495	0.0122	3.01
Ayeyawady	Maubin	Maubin	6,175	6,798	1.10	0.0355	0.1315	0.1390	0.1237	0.0921	0.0432	0.0114	2.88
Ayeyawady	Myaungmya	-	15,834	17,985	1.14	0.0340	0.1284	0.1455	0.1339	0.0987	0.0501	0.0110	3.01
Ayeyawady	Myaungmya	Myaungmya	5,891	6,857	1.16	0.0361	0.1251	0.1443	0.1365	0.1017	0.0468	0.0117	3.01
Ayeyawady	Myaungmya	Wakema	6,024	6,863	1.14	0.0320	0.1323	0.1490	0.1398	0.1022	0.0558	0.0107	3.11
Ayeyawady	Myaungmya	Einme	3,919	4,265	1.09	0.0337	0.1276	0.1420	0.1218	0.0892	0.0461	0.0106	2.85
Ayeyawady	Labutta	-	14,896	16,489	1.11	0.0563	0.1547	0.1576	0.1360	0.0991	0.0510	0.0103	3.33
Ayeyawady	Labutta	Mawlamyinegyun	6,983	7,724	1.11	0.0448	0.1405	0.1508	0.1317	0.0976	0.0502	0.0111	3.13
Ayeyawady	Labutta	Labutta	5,296	5,892	1.11	0.0555	0.1541	0.1546	0.1304	0.0933	0.0467	0.0086	3.22
Ayeyawady	Labutta	Pyinsalu (Sub-Tsp)	2,617	2,873	1.10	0.1060	0.2054	0.1897	0.1683	0.1231	0.0679	0.0125	4.36
Ayeyawady	Hinthada	-	20,219	20,219	1.00	0.0323	0.1043	0.1160	0.1012	0.0703	0.0305	0.0057	2.30
Ayeyawady	Hinthada	Kyangin	1,390	1,241	0.89	0.0302	0.0796	0.0858	0.0637	0.0399	0.0174	0.0036	1.60
Ayeyawady	Hinthada	Zalun	3,241	3,391	1.05	0.0326	0.1085	0.1274	0.1199	0.0823	0.0385	0.0068	2.58
Ayeyawady	Hinthada	Myanaung	3,850	3,670	0.95	0.0310	0.0985	0.1099	0.0935	0.0658	0.0272	0.0059	2.16
Ayeyawady	Hinthada	Laymyethna	2,049	2,046	1.00	0.0351	0.1241	0.1341	0.1174	0.0760	0.0353	0.0057	2.64
Ayeyawady	Hinthada	Hinthada	5,778	6,039	1.05	0.0278	0.0976	0.1185	0.1052	0.0731	0.0326	0.0057	2.30
Ayeyawady	Hinthada	Ingapu	3,911	3,832	0.98	0.0401	0.1186	0.1145	0.1002	0.0741	0.0289	0.0059	2.41
Nay Pyi Taw	-	-	20,148	22,713	1.13	0.0334	0.1082	0.1233	0.1075	0.0736	0.0320	0.0067	2.42
Nay Pyi Taw	Ottara (North)	-	9,191	10,783	1.17	0.0368	0.1139	0.1278	0.1055	0.0730	0.0282	0.0072	2.46
Nay Pyi Taw	Ottara (North)	Tatkon	3,212	4,145	1.29	0.0342	0.1031	0.1207	0.0962	0.0675	0.0264	0.0073	2.28
Nay Pyi Taw	Ottara (North)	Zeyarthiri	2,144	2,268	1.06	0.0310	0.1146	0.1295	0.1052	0.0697	0.0304	0.0071	2.44
Nay Pyi Taw	Ottara (North)	Ottarathiri	1,594	1,817	1.14	0.0530	0.1380	0.1306	0.1127	0.0785	0.0265	0.0075	2.73
Nay Pyi Taw	Ottara (North)	Pobbathiri	2,241	2,553	1.14	0.0365	0.1157	0.1376	0.1172	0.0848	0.0314	0.0073	2.65
Nay Pyi Taw	Dekkhina (South)	-	10,956	11,930	1.09	0.0307	0.1034	0.1195	0.1090	0.0740	0.0350	0.0063	2.39
Nay Pyi Taw	Dekkhina (South)	Pyinmana	3,129	3,686	1.18	0.0280	0.1053	0.1191	0.1096	0.0716	0.0342	0.0080	2.38
Nay Pyi Taw	Dekkhina (South)	Lewe	5,615	6,018	1.07	0.0353	0.1179	0.1307	0.1146	0.0808	0.0420	0.0065	2.64
Nay Pyi Taw	Dekkhina (South)	Zabuthiri	1,674	1,684	1.01	0.0200	0.0632	0.0926	0.0982	0.0635	0.0205	0.0032	1.81
Nay Pyi Taw	Dekkhina (South)	Dekkhinathiri	538	542	1.01	0.0325	0.1051	0.1225	0.0920	0.0628	0.0302	0.0062	2.26

[a] Adjustment factor (rounded)

LIst of Contributors

Contributors to the Fertility and Nuptiality thematic report

NAME	INSTITUTION	ROLE
Government Coordination		
U Myint Kyaing	Permanent Secretary, Ministry of Labour, Immigration and Population	Overall administration and coordination
U Nyi Nyi	Director, Department of Population (DOP)	Administration, coordination and quality assurance
Daw Khaing Khaing Soe	Director, DOP	Administration, coordination, data process and quality assurance
UNFPA Coordination		
Janet E. Jackson	UNFPA Country Representative	Overall administration and coordination
Fredrick Okwayo	Chief Technical Advisor	Overall design, administration, coordination and quality assurance
Petra Righetti	Census Donor Coordinator	Administration and coordination
Thet Thet U	Programme Assistant	Administration and logistics
Tun Tun Win	Project Assistant	Administration and logistics
Authors		
Griffith Feeney	UNFPA Consultant	Lead Author
Daw Khaing Khaing Soe	Director, DOP	Assisting Author
Daw Thida	Assistant Director, DOP	Trainee and Assisting Author
Daw Myo Thandar	Staff Officer, DOP	Trainee and Assisting Author
Daw May Myint Bo	Staff Officer, DOP	Trainee and Assisting Author
Daw Wai Wai Hlaing Zin	Assistant Immigration Officer, DOP	Trainee and Assisting Author
U Zaw Hlaing Phyo	Junior Clerk, DOP	Trainee and Assisting Author
Reviewers and Editors		
Ian Stuart White	UNFPA Editing Consultant	Editing and reviewing
Fredrick Okwayo	UNFPA Chief Technical Advisor	Proof reading, editing and reviewing
Daniel Msonda	UNFPA Census Consultant	Proof reading, editing and reviewing
Pedro Andres Montes	UNFPA Census Consultant	Editing and reviewing
Esther Bayliss	UNFPA Communication Consultant	Proof reading, editing and reviewing
U Nyi Nyi	Director, DOP	Proof reading, editing and reviewing
Daw Khaing Khaing Soe	Director, DOP	Proof reading, editing and reviewing
Andreas Claudius Demmke	UNFPA Consultant	Technical peer review
Thomas Spoorenberg	United Nations Statistics Division	Technical peer review
Data Processing and IT Team		
Arij Dekker	UNFPA Data Processing Consultant	Data editing and programming
Daw Khaing Khaing Soe	Director, DOP	Programming and generation of tables
Daw Sandar Myint	Deputy Director, DOP	Programming and generation of tables
Daw May Myint Bo	Staff Officer, DOP	Generation of tables
Daw Su Myat Oo	Immigration Assistant, DOP	Generation of tables
Daw Aye Thiri Zaw	Junior Clerk, DOP	Generation of tables
U Wai Phyo Win	UNFPA Census IT Manager	Information technology services

Thematic Report on Fertility and Nuptiality can be downloaded at:

www.dop.gov.mm

or

http://myanmar.unfpa.org/census